

(Photo. by Messrs. Salmon, Winchester.)

WINCHESTER CATHEDRAL: SOUTH-EAST VIEW FROM THE DEANERY GARDEN.

FOUNDATIONS: THE USE OF DIVERS AND THE GROUTING MACHINE.

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Read before the Royal Institute of British Architects, Monday, 17th February 1908.

THE British Islands are so rich in cathedrals, abbeys, churches, castles, and other buildings dating, in many cases, from a remote past, and so many of these are suffering from the ravages of time, that my apology, if apology be needed, in thus occupying your time and attention, is the desire in the minds of all, that as these structures have been handed down to us by our ancestors, we should endeavour to preserve them for the use and delight of many generations to come.

When we look at these noble buildings, and consider the enormous expenditure of money and of thought, of skill and of taste, bestowed upon them, and remember that they are heir-looms, forming priceless history of art and architecture, the capital cost of which we have not to pay, the least we can do is to keep them in repair. In effecting this, we should aim at adopting some system that will not attract attention. The characteristics and features, the old stones with their cracks and deformations, with their weather-worn arrises and surfaces, with the very moss, should, if possible, be preserved. In those cases in which the actual stone has perished, it must, of course, be replaced by new; but walls that are simply cracked, or are within certain limits out of upright, should be secured without the constituent parts being removed or renovated.

I have in many cases pleaded for our ivy-covered buildings, that this lovely ornamentation of foliage should not be removed, but I have very reluctantly been driven to the conclusion that ivy is an enemy, and that it is guilty of having injured most seriously many buildings on which it has been allowed to grow. We have, however, an excellent substitute in the *Ampelopsis Veitchii*, or, as it is known in America, "Boston Ivy." As we all know, this requires no attention, clinging of its own accord to almost any material, and giving in October a glorious garment of crimson and gold. In one respect it fails in comparison with ivy, and

that is, being deciduous, it does not afford protection to the walls from snow and rain during the months of winter ; and, again, unless it be kept within bounds, it is liable to hide the beauty of the architectural details. But the ordinary ivy penetrates into the joints, seeking its nourishment from the old mortar, and as its rootlets grow in size it lifts the courses of masonry and cracks the stones with a force that is irresistible.

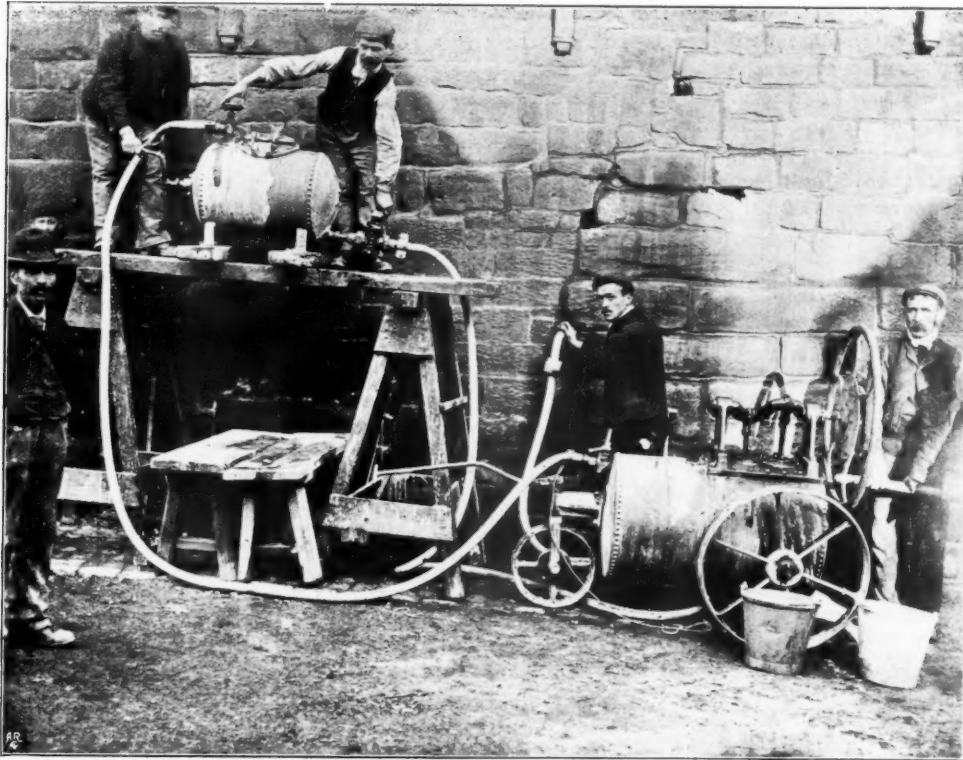
But my object to-night is to call attention to a method of repairing old walls at a minimum of cost, and with a maximum of strength ; although many engineers are familiar with the process it has very seldom been applied, and is not known to circles outside their profession. When a wall cracks the ordinary remedy is to send for a builder or a mason and employ him to point up the injury, which he does with mortar and trowel, and he succeeds in producing a result satisfactory to his own pocket and, for a time, pleasing to his employer's eye. But it should be borne in mind that this pointing goes in for only an inch in depth, and that the injury to the wall is in no degree remedied : the crack remains a crack, and its tendency to widen is by no means lessened.

I do not at present desire to deal with the question of faulty foundations, although these are responsible for many failures. In all cases these should be examined, but, in many instances, the upper portions of the work are so weakened and disintegrated that to attempt at the outset to rectify the defects below, would bring the whole structure into ruin. To underpin a badly cracked cathedral or church, before securing the fabric itself, is often to court disaster. The Romans were probably aware of the value of "grouting up" their work, but they had not the necessary appliance for doing it effectually ; nor had we until within the last twenty years, when the late Mr. James Greathead invented the grouting machine for use in the construction of deep tunnels or electric tube railways of London. And here it will be desirable to explain what is meant by the term. If a mixture of cement, sand, and water be made in proper proportion, it is called "grout," and when this is poured like cream into the cavities of a wall, the wall is "grouted up." This is apparently a very simple process, but it is nevertheless one which requires judgment and care.

Some forty years ago a large railway bridge over the London and South Western Railway had a pier cracked from top to bottom, not in consequence of bad foundations, but due to carelessness on the part of the masons fixing the bed stones for the column. This was so badly injured that it had to be rebuilt, and fear was entertained that all the other piers might prove to be suffering from the same defect. To avoid having to reconstruct the entire number, "grouting" was adopted, and, by applying a funnel and pipe of considerable height, cement grout was forced by the hydrostatic pressure into any cavities which existed. Thus an accident was averted at a cost of £5 or £10, and a probable expense of several hundreds was avoided.

Another instance was that of an ordinary arched bridge to carry an express line of railway over a roadway which was under construction. The centering was, in error, taken down too soon, with the result, that the abutments were pushed right and left on the masonry joints, making an unintentional plinth on both sides, and cracking the arch in several places through its entire width. The grouting system was applied as an experiment to avoid an expense of £500, which would have been necessitated by the reconstruction of the bridge. After an outlay in labour and cement of £27, the structure was completely repaired (except that these unequal plinths remain), and it has for twenty-five years carried some of the heaviest express locomotives travelling at high speeds. But it will be observed that, unless height can be obtained for funnel and pipe, this system cannot be applied, and thus in cellar and tunnel work it could not be used. Hence it was that Mr. Greathead proposed to abolish the funnel and vertical pipe, and in its place to apply compressed air.

The grouting machine [fig. 1] consists of an iron receiver or reservoir into which, by means of pumps, air can be forced under any pressure up to 100 lb. to the inch. This receiver is connected by a flexible tube to another portion of the apparatus called the "grouting pan," which is in fact a churn furnished with a handle and spindle to which are attached arms or beaters. The proper proportions of cement and water, and in certain cases sand, are then placed inside, the lid screwed down, and the contents churned up into the consistency of cream. This is now ready to be blown into the crack, the mouth of which on either side of the wall has meanwhile been clayed up to prevent the grout from escaping. The compressed air is then



(Photo. by W. Mattheis Jones, Chester.)

FIG. 1.—THE GROUTING MACHINE AT WORK.

admitted to the grouting pan, and so soon as the necessary valve is opened the contents are discharged into the wall.

Having thus at our command an apparatus by which cement can be blown right into the heart of any structure, whereby all the loose particles of stone and the opposite sides of the crack can be agglutinated or, more properly, cemented together, we have the power of repairing injured buildings without being compelled to pull them down. The expense of grouting is very small, and does not generally amount to the one fifteenth or even one twentieth part of the cost of pulling down and rebuilding.

One of the first applications of this system was carried out by the late Mr. Greathead in the case of some extensive wine cellars. In consequence of some adjacent excavations, these

cellars had been cracked ; and although the injury to the building was not important, still the expense which would have been incurred was very great. These cellars contained costly wine, and it was estimated that the mere transference of it to other cellars would have depreciated its value to the extent of some £10,000. Hence it was essential that, if possible, this should be avoided, and the grouting machine was applied. So successful was the result that not even a single bottle of wine had to be moved, and the entire cost of the work was only a few pounds.

Soon after this an alarming paragraph appeared in a certain London daily paper to the effect that, owing to tunnelling operations, the spire of Bow Church in Cheapside was *13 feet 6 inches* out of the upright ! The Rector and his Wardens consequently were perturbed by this statement, and requested us to examine and report on the subject. In the course of our investigation several matters came to light which are of considerable interest and deserve to be placed on record. It was deemed advisable, pending the enquiry as to the cause and extent of the injury, to stop the pealing of the bells ; and as, we all are aware, those children born within sound of Bow bells are known as "Cockneys," the curious result was that, for the fortnight during which the bells were silent, no "Cockneys" were born. It appears that the foundations of the tower and spire stand upon the Cheapside pavement of Roman time, which to-day is some 18 feet below the present level of the street. This continual raising of the level of London is doubtless due to the fact that the rubbish, resulting from the various fires from which the City has suffered in years gone by, and from the demolition of buildings, was not carted away, as is done to-day, but the surface was simply levelled down and the new buildings erected upon it. That there were cracks in the portion of the building connecting the church with the tower is undoubtedly true, but they were of ancient origin. Our task was to ascertain whether the tower and spire were out of perpendicular, and if so, to what extent. At first sight nothing was easier than to drop a plumb-bob and line from the top to the ground ; but we soon found that there was no access to the upper part of the steeple, and that if it had to be reached it would be necessary to erect a scaffolding—a matter of considerable expense. We therefore decided to take the necessary theodolite observations from both ends of Cheapside, but a fresh difficulty presented itself. It was then winter, and the mornings and evenings were so dark that the traffic had commenced and continued to run, before and after any such measurements could be taken. We therefore had to wait until the summer, when, in the early morning, we could have the free use of the street before carts had begun to pass. But it was then found that, although no traffic was moving, the vibration in the instrument was so great that no accurate result could at first be attained. The goods traffic on the London Chatham and Dover Railway at Ludgate Hill, the early trains on the District Railway, the trains on the Central London, all made themselves felt upon this delicate instrument, and we began to think we should fail to obtain any reliable result, and that London was never free from tremor. At last, however, it was found, on a bright summer's Sunday morning about four o'clock, that the throb and pulsation of London had ceased for a short time, and just at that moment we were able to obtain accurate measurements. Instead of 13 feet 6 inches (which, of course, had been misprinted instead of 13½ inches) we found that the total divergence from a vertical line was 8 inches, which was exactly accounted for by the small cracks visible in the walls of the structure.

About a year later a summons from the Mayor of the ancient city of Chester necessitated a visit to examine the towers and walls of those interesting remains, partly of Roman, partly of mediæval times. Evidently one of the towers was in jeopardy : it was cracked from top to bottom, and the various parts were moving in opposite directions. Whether the foundations were in fault, or the walls were weak, it was impossible to say ; but the first thing to be

done was to shore the tower with timber to prevent a collapse. The grouting machine was then applied, commencing at the base of the tower and gradually working upwards. By this means the cracks were filled with cement, and the walls were turned into monoliths; all the bulging portions, the old stones, and worn surfaces were left untouched, thus preserving the artistic and archaeological interests. Then the foundations could be examined, strengthened,



(Photo. by W. Matthew Jones, Chester.)

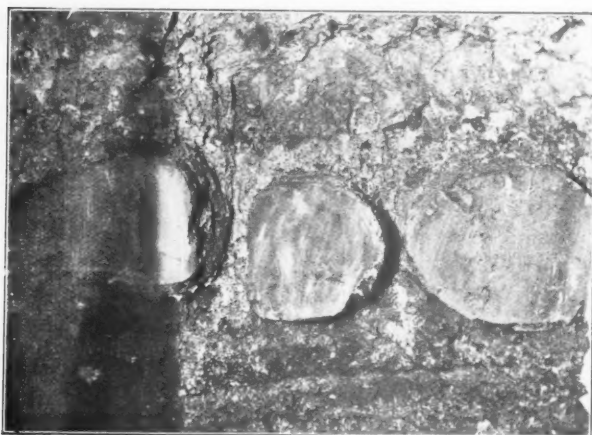
FIG. 2.—CHESTER WALLS: SECTION OF THE OLD RAMPARTS.

and underpinned, and everything put on a satisfactory basis. Although several years have elapsed since these repairs were effected, and the new lines of the London and North Western Railway have been in constant use, no further cracks nor movements have taken place.

A view is given of the cross-section of the ancient rampart [fig. 2] which consists of two badly built walls, the space between filled up with gravel, rubbish, and loose stones. This was thoroughly saturated with cement and the movement was arrested. The fine arched

bridge over the river Dee, built by Telford, was seriously cracked in the land arch and wing walls, but again the mischief was stopped by the grouting machine. The photographs by Mr. Jones, Assistant Borough Engineer of Chester, of the grouting machine in operation [fig. 1] will, with the foregoing explanation, make it easy to understand the process.

One of the most interesting applications of the grouting machine is at Winchester. This splendid cathedral was—by the direction of Dr. Furneaux, the Dean—being repaired by Mr. T. G. Jackson, R.A., the diocesan architect, and the late Mr. J. B. Colson, the architect of the cathedral, whose recent death is deeply regretted by all. These gentlemen had found that very serious subsidence had taken place in various parts, that in the presbytery amounting to nearly 2 feet 6 inches. The outer walls and buttresses had gone seriously out of the perpendicular, while the beautiful groined arches were distorted in form and disintegrated in character, and alarm had been caused by the fall of some stone from the roof. Mr. Jackson had sunk a trial pit some few yards distant, and had discovered a bed of peat 8 feet deep below the clay and resting upon a fine solid bed of flints and gravel, into which he had bored to some depth to prove its solidity. An excavation 5 feet in width was then made adjacent to the south wall, in which, at a depth of about 8 feet below the turf, the bottom of the masonry foundation was reached. It was discovered that the wall had been built on logs of beech wood, in fact, whole trees placed side by side horizontally [fig. 3], and these again, in their turn, rested in some instances on a second layer of trees. These timbers were to some extent rotten, but in other cases the heart was sound and good as ever. The



Photographed in situ.

FIG. 3.—WINCHESTER CATHEDRAL: OLD BEECH TREES UNDER THE WALLS OF PRESBYTERY (A.D. 1202).

curious feature was, that even the rotten portion showed no signs of squeezing nor flattening under the weight of the wall. The level of the underside of these timbers coincided at that date with that of the water in the subsoil, although this level varied with dry and wet weather. This probably accounts for the timber decaying, as, in consequence of the draining of the city by the Corporation, the level has been permanently lowered, and the timber, which doubtless was just below water level, has of late years been alternately wet and dry, and has, consequently, to some extent, decayed. Beneath this timber a bed of chalky marl [fig. 4], in places 6 feet in thickness, was found to exist; and as very little pumping was required to keep the excavation dry, and the water came away clear and pellucid without any sand or deposit, the work was able to be proceeded with by means of a hand pump. The bed of peat proved to be almost impervious to water; but when within about a foot of the bottom (the entire thickness proving to be from 5 feet to 8 feet 6 inches) the lowest layer was suddenly burst up by the influx of a great volume of water from the gravel bed below, under considerable head. This was due to the water in the adjacent river, and in the course of a minute the whole pit was filled with water up to the original level. Pumping was plainly inadmissible, the use of compressed air was inapplicable, screw piles and caissons were considered and

rejected, a slab of concrete on which to float the cathedral was impossible, and finally it was decided to employ a diver, by which means the work could be done quietly and without vibration. A telegram to Messrs. Siebe & Gorman brought down two of their most experienced men, and by their aid [fig. 5] the excavation, in lengths of 5 feet, was finished, after which I descended in the dress to examine the bottom. This proved to be a hard flinty gravel, quite excellent, and, as this overlies the chalk, no better foundation could be either secured or desired.

Perhaps a few words may be of interest with reference to the diving. The boots weigh 20 lb. apiece, each having a thick lead sole; the dress weighs 30 lb.; the leads on chest and back are 40 lb. each, and the helmet 20 lb., making, with the remainder of the equipment, a total load to be carried of nearly 200 lb. But, notwithstanding all this, the flotation power of the water is so great that, in the case of a lightly built person going down the ladder, instead of treading on the rungs, it is necessary to place the feet beneath them, and pull oneself down step by step. The pits are absolutely dark owing to the water being thick with peat, and no artificial light is possible; consequently

the whole of the work is done, not by sight, but by feeling. So soon as the peat is excavated the bottom is covered over with bags filled with concrete, carefully and tightly trodden in all round; these are then slit open and another layer of bags placed on the top. These again are ripped up, and so on for four courses in all. The grouting machine can be used, the pipe being directed by the diver, but in this case all the chinks and crannies between the bags are filled by hand with cement concrete lowered down to him in buckets. Thus this mass becomes practically a solid rock and seals down the flood of water from the gravel, enabling the excavation to be pumped dry. Concreting is then continued, either in bulk or in block, until a considerable height is attained, and upon this blocks of concrete or brick in cement [fig. 6] are carried up and tightly pinned to the underside of the old masonry, constituting the original foundations of the cathedral. When all these excavations or pits are completed, the walls of

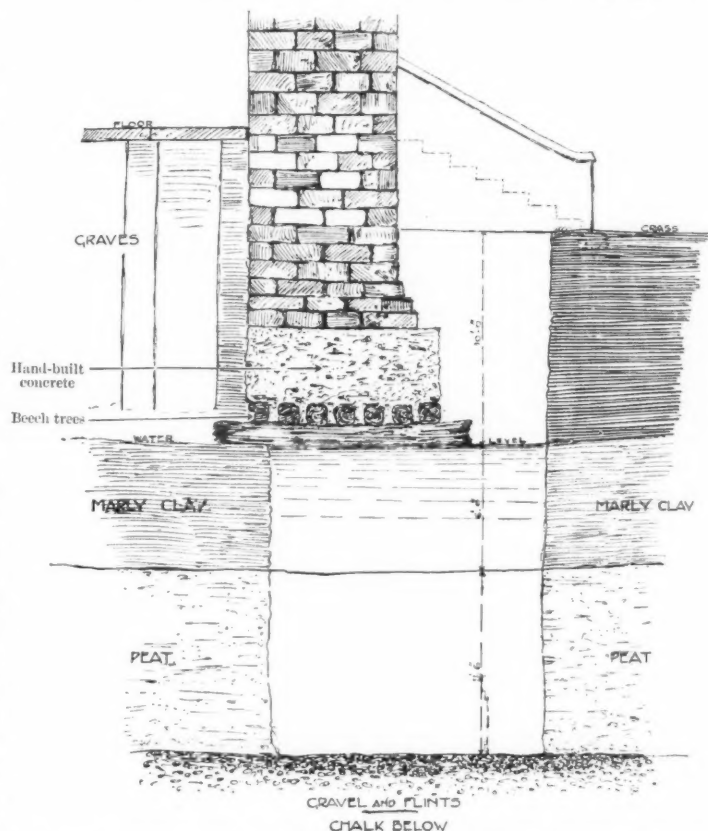


FIG. 4.—WINCHESTER CATHEDRAL: SECTION THROUGH WALL OF PRESBYTERY SHOWING BEECHWOOD UNDER THE FOUNDATIONS AND RELATIVE POSITIONS OF MARLY CLAY, PEAT BED, AND GRAVEL.

the presbytery will be practically standing on a bed of rock, instead of on compressible peat, and great credit is due to Mr. Walker, the diver, for the excellent manner in which he has executed this most responsible work.

The sequence of operations is as follows:—

1. Shoring up outside and inside the walls and vaulting.
2. Grouting the walls, arching and buttresses [fig. 7].
3. The underpinning of the walls down to the gravel.

When the above is done, the cracks will be cut out and repaired, and steel tie-bars will

be fixed in different parts of the fabric. Photographs illustrative of the cracks are given [figs. 8, 9, 10, 11].

An interesting fact in connection with this cathedral is given in the *Ecclesiastical Annals of Winchester*. It appears that in 1079 Bishop Walkelyn, a relative of William the Conqueror, laid the foundation of the Norman Church, but the Bishop, finding himself distressed for want of timber, applied to the King for permission to fell some of the trees. William consented, and gave the Bishop a grant to fell and bear away as much as he could in four days and nights. Walkelyn collected together all the woodmen of the country and cut down and carted away every tree in the forest in the prescribed time, save the large oak under which St. Augustine is said to have preached. The King, returning to Winchester a few days after, looked about for the wood, saying that his eyes were either fascinated or that he had lost his senses, as he could not discover the forest which had existed there a short time before. His attendants, however, explained the circumstances, which at first irritated William against the Bishop, the King remarking, "Most assuredly, Walkelyn, I was too liberal in my grant, you too exacting in the use of it." The timber then cut still



FIG. 5.—WINCHESTER CATHEDRAL: THE DIVER DESCENDING TO HIS WORK IN 14 FEET OF WATER.

forms portions of the nave roof. The building occupied fourteen years, and on 8th April 1093, in the presence of nearly all the bishops and abbots of England, the monks of Winchester removed from the old minster to the new church with the "greatest exultation and glory."

It has now been ascertained that almost the entire cathedral stands on peat [fig. 4], which must be excavated. The south transept is over 4 feet out of the perpendicular, and cracks of the gravest character are found in all directions. The most serious fact is that the cathedral is sinking, due to the further compression of the peat in those places whence it has not yet been removed. "Tell-tales" or fillets of cement are placed across the cracks to give warning of any movement taking place, and except in those parts which have already been



(Photograph by flashlight.)

FIG. 6.—WINCHESTER CATHEDRAL: SHOWING THE CONCRETE BAGS DEPOSITED BY DIVER—AFTERWARDS BUILT UPON BY MASONS WITH BLOCKS OF CONCRETE OR BRICK IN CEMENT.

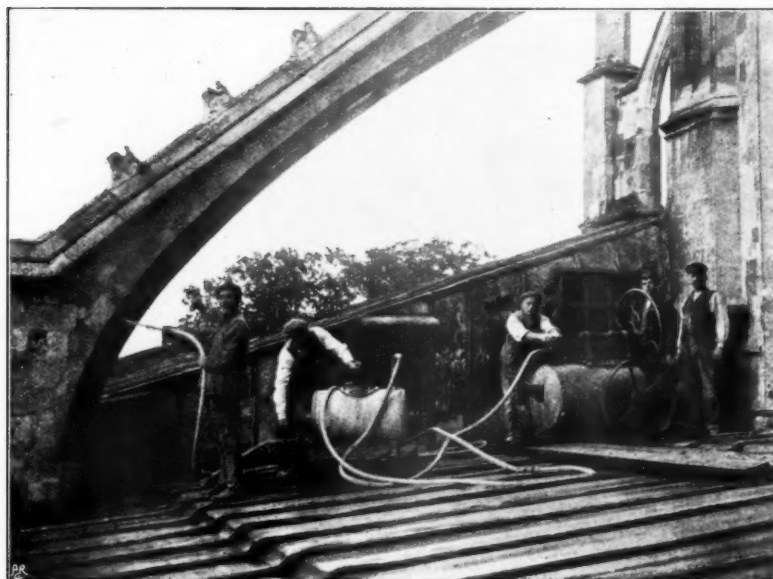


FIG. 7.—WINCHESTER CATHEDRAL: THE GROUTING MACHINE AT WORK ON THE ROOF.

underpinned, these cement fillets are broken through, in many cases within a month. In fact, the cathedral is doomed unless it is underpinned, and that without delay. Further extensive investigations will have to be made and repairs effected, both in the transept walls and main north and south aisles of this splendid cathedral, involving heavy expense. His Majesty the King has not only subscribed liberally to the fund for saving the edifice, but has commended this great work to his people; and surely they will not allow the Dean and Chapter to be

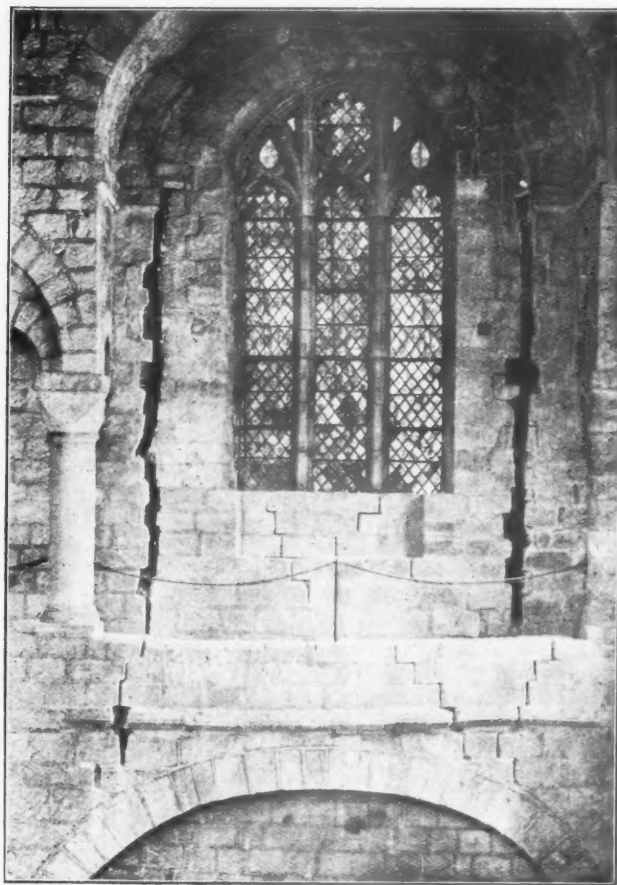


FIG. 8.—WINCHESTER CATHEDRAL: S. TRANSEPT, E. SIDE, S. WINDOW OF CLERESTORY.

whilst at the north-west angle the Saxon work threatened to fall bodily off. The mortar of the walls had perished through age, and the ivy had penetrated into the interior of the church in every direction. It would have been unsafe to attempt any examination of the foundations for fear of bringing down the whole fabric; consequently the grouting machine was applied all over the building. The "grout" escaped at every point, and it occupied the attention of the masons both inside and outside, to stop it promptly by dabbing red clay on to the openings from which it was running. By the time the walls had taken all the grout that could be forced in, the church was practically a red building, both inside and outside, from the extensive

hindered for the want of the necessary means to secure this building for the use of future generations. It is the burial place of several of our Saxon kings, and is bound up in the history of our country through the whole line of sovereigns to the present date. Messrs. Thompson, of Peterborough, are the contractors, and they are ably represented by Mr. Ferrar; the clerk of the works being Mr. Long, to both of whom I am indebted for several excellent photographs. On the table are exhibited a portion of one of the beech logs and specimens of the peat and flint gravel bed.

The ancient church of Corhampton, near Bishop's Waltham, in Hampshire, repaired by Mr. Jackson, is another satisfactory instance of the application of the grouting machine. This Saxon church, 1,300 years old, was in a sadly dilapidated condition. In the west gable there were three large cracks, one from the ridge to the ground wide enough for a man's arm to enter; another, nearer the side wall, wide enough for the insertion of his head,

use of this red clay. The cracks were in places so wide that they had to be specially treated before commencing to grout them, and the clay was so arranged as to extend into the crack about an inch on both faces. After the operation had been completed and the cement had set hard, the clay was removed and the interior was found to be filled with adamant; but as it did not come within an inch of the face of the wall, sufficient depth was left for fixing the flint work outside, and tiling inside. The result is that no trace of the crack is visible, and after this treatment of the walls they are stronger and better than they ever were. Subsequent steps were then taken to examine and, where necessary, to underpin the walls, and we have the satisfaction of knowing that these efforts have saved the church. The Vicar, the Rev. H. Churton, writing on the subject on 18th October 1906, said: "The grouting was most effective, and I think the walls are now quite safe, and all without moving one of the Saxon 'long and short' stones."

Holy Trinity Church, Hull, of which the Rev. A. B. G. Lillingston is vicar, is the most recent instance of the application of this system; but the difficulties were as great or greater than any of those already described. This magnificent church [fig. 13], one of the three largest in England, was built soon after A.D. 1300, at which date the foundations of the tower were laid. The choir was completed in 1361, the nave in 1418, and the upper portion of the tower in 1520. The church consists of a fine nave of eight arches on each side, with side aisles, the choir

of five arches and also with side aisles; a transept with the handsome tower in the middle standing on four massive piers [fig. 14], each one cruciform on plan. The weight of the tower is 2,800 tons, equivalent to 700 tons on each pier. For some time past signs of serious settlements had shown themselves in the arches and piers surrounding the tower, and these had been under the observation of the architect of the church, Mr. F. S. Brodrick, York diocesan surveyor. These movements had caused considerable cracks, and portions of masonry had from time to time fallen, the most alarming of which was that of a large corbel carrying



FIG. 9.—WINCHESTER CATHEDRAL: DISINTEGRATED CONDITION OF THE VAULTING OF PRESBYTERY.

the ridge of the choir roof on the eastern face of the tower. The piers of the nave, which for their height are very slender, and are each carrying a load of 75 tons, exhibited serious deviation from the perpendicular, being from six to seven inches out of plumb, and the subsidence of the tower had caused the joints of the shafts to open on one side and to crush on the other. These movements were going on at a somewhat alarming rate when I was called into consultation. A tradition existed that, as the town of Hull stands on a bed of clay overlying a deep bed of silt, the tower was built on a raft of timber, but this required investigation. On making a careful survey of the building in conjunction with Mr. Brodrick, we came to the conclusion that, from some cause or other, the tower was slowly sinking, and in so doing was pushing all the arches at the west end towards the west, and all the arches at the east towards the east. The first thing to be done was to strut and cross-brace the arches and columns to prevent the possibility of a collapse; next to examine the brickwork in the spandrels of the arches adjacent to the tower. These were covered with plaster, but, on this being removed, serious cracks



FIG. 10.—WINCHESTER CATHEDRAL: THE BROKEN RIB AND ARCH OF THE VAULTING IN THE PRESBYTERY.

were found, showing that the brickwork was being dragged down by the pier. A hole was then made in the floor of the church, and, as expected, a timber raft of horizontal oak baulks crossing each other at right angles was discovered. The upper layer had been reduced—by rot—to a powder resembling “coffee-grounds,” and innumerable worms known as “eel worms,” from one eighth of an inch to a half-inch in length, infested the material. The destruction of the upper layer was practically complete, and the lower layer of timber was decay-

ing [fig. 15]. The masonry overlying this timber was cracked and flaked in all directions and most seriously injured, and a very interesting and unexpected discovery was made. A stone seat, or bench table [fig. 16], was found surrounding the pier of the tower, and partly in consequence of the sinking of the tower, and partly as a result of the floor being raised at some period, this seat is now below the tiling, and completely out of sight, and all record of it had been lost. Stone seats of this character are said to have given rise to the expression “the weakest go to the wall.” This is generally considered to imply that in the rush and race of life the strongest pass by the weakest, who are ground against the wall. However, it is said to mean that in mediæval times, when services were held in the body of the churches (as in the cathedrals and churches on the Continent of to-day), no sitting accommodation being provided, the strongest had to stand, but the weakest would find seats if they went to the wall. Certainly this is the more pleasing interpretation of the saying.

Pending the decision as to the very difficult problem involved in this parish church of

Hull, for the removal of the decaying timber and crushed masonry, all of which had to be replaced, the grouting machine was freely used for pumping or forcing in cement into every cavity and crevice, and for filling up all the voids left by the decayed timber. Beneath the columns of the nave vertical piles, probably of larch, were found, but in some instances the timbers had gone into powder, leaving only the form of the timber impressed in the clay, so that where a pile formerly existed only a cylindrical hole similar to the moulded form for casting a pipe remained, and at the bottom of the holes was a mass of the before-mentioned "coffee-grounds." The contractors are Messrs. Thompson, of Peterborough, whose representative, Mr. Ball, has carried out the difficult and often dangerous operation with great skill. One pier of the tower was dealt with at a time, and the greatest care had to be exercised. An excavation 24 feet in length by 6 feet in width, and to the same depth as the old work, was made clear of the pier, and on both the east and west sides, and was filled with concrete in which were placed grillage beams in order to distribute the eventual weight over the whole area. A hole 2½ feet in depth and about 9 inches in width was then carefully cut or "jumped" through the masonry of the pier, and a steel girder, 24 inches by 7 inches, was threaded through the hole and rested on the grillage beams in these concrete blocks [fig. 17]. In order to prevent subsidence, due to the deflection



FIG. 11.—WINCHESTER CATHEDRAL: CRACK IN WINDOW E. END, N. AISLE MAIN CRYPT.

of the girder when it received its load, steel wedges were driven in under the end of the steel beams, thus giving the initial deflection, and avoiding by this means all sinking of the pier. The girder was then built into position with blue brick in cement and was carefully grouted up. A second, third, and fourth steel beam were in due rotation placed in position, and in this manner the load was quietly and safely transferred from the decaying wood beams on to the steel girders. After this the old cracked masonry and rotting timbers (which were found to be snapped through) were removed, one-fourth part at a time, from beneath the pier, and their place filled up with concrete in cement, with the result that to-day each pier stands on

about 560 square feet of solid concrete instead of on the old defective foundation. As soon as the four piers of the tower were secured the columns of the nave were taken down, one at a time, and rebuilt in vertical position with so much of the old masonry as was available [fig. 18];

but in consequence of the transverse strains brought to bear upon them, we found about two blocks out of twelve fractured and useless [fig. 19].

A most satisfactory feature in connection with Hull Parish Church is the fact that when a town meeting was convened by the Mayor—a prominent Wesleyan Methodist—he called attention to the fact that the saving of this church was the duty of all classes and of all denominations. One of the local Members of Parliament, a Primitive Methodist, endorsed these remarks, and urgent appeals were then made by the Bishop of Ripon, the Bishop of Hull, and by the Vicar, the Rev. A. B. G. Lillingston. The meeting was attended by all classes and all denominations, and thus a great and united effort was made to raise the necessary funds to secure this fine church as the future cathedral of Hull.

I am desirous of saying a few words as to the risk of fire in these venerable and priceless build-



FIG. 12.—WINCHESTER CATHEDRAL: SHOWING PLUMB-LINE ON S.E. RESPOND PIER, LANGTON CHAPEL PRESBYTERY; OBSERVE PLUMB-BOB HANGING FROM THE CAP DOWN TO THE BASE.

ings. We introduce all kinds of modern ideas in order to bring them in comfort up to date, such as furnaces, gas, electric light; but we often fail to introduce at the same time the necessary precautions. The plumber on the roof is a well-known cause of disaster, and to-day workmen carry into the most inflammable places, such as amongst timber roofs, flaring petroleum lamps and plumber's blow-lamps. The most stringent rules are required if we desire to protect these buildings. If workmen have to visit such places in the dark, the use of oil should be absolutely prohibited, and wax candles inside lanterns only allowed. Even

these should be numbered and returned when done with to an official entrusted with this duty.

The preservation of the old road bridges throughout the country is a matter of the greatest importance, not only to the ratepayers, who will be heavily taxed if they have to be replaced by new structures, but also with a view to continuing for future generations these delightfully



(Photo. by Messrs. Turner & Drinkwater, Hull.)

FIG. 13.—HOLY TRINITY CHURCH, HULL: FROM THE SOUTH-WEST.

picturesque features in the landscape. Many of these bridges, owing to the increased weight and speed of traffic, and in consequence of the decay of the mortar, have cracked in places: they are then reported by the County Surveyor as being in a dangerous condition, and this is followed by their condemnation by the County Council, who, in the absence of any knowledge as to a ready means of saving them, are helpless in the matter. The result is that these old structures are disappearing from the face of the land, and are being replaced by others costly and often unattractive, all the historical and architectural features being lost.



Photo. by Messrs. Turner & Drinkwater.

FIG. 14.—HOLY TRINITY CHURCH, HULL: FROM WEST END. THE CENTRAL TOWER SINKING; THE NAVE PILLARS OUT OF PERPENDICULAR.

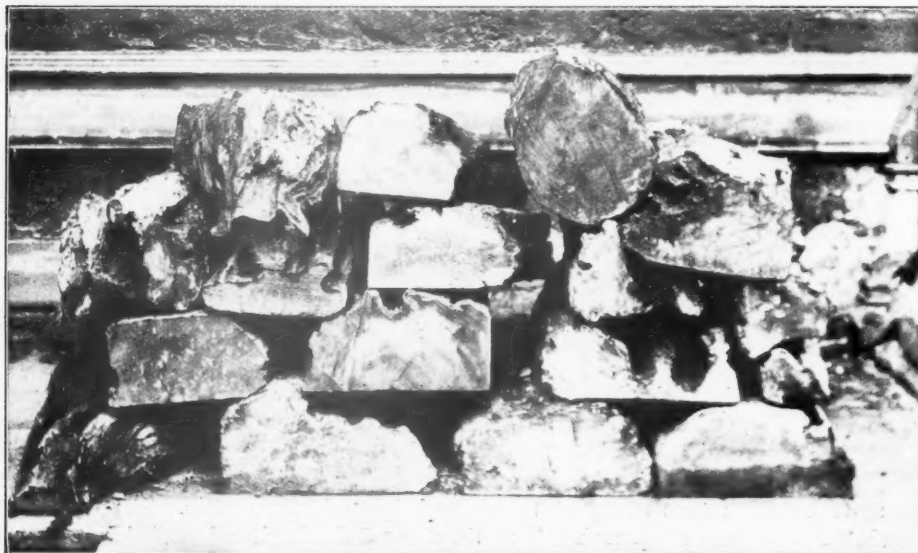


FIG. 15.—HOLY TRINITY CHURCH, HULL: SOME OF THE SMALLER OAK LOGS FROM UNDER THE TOWER SHOWING SERIOUS DECAY.



Photo. by Messrs. Turner & Drinkwater, Hull.
 FIG. 16.—HOLY TRINITY CHURCH, HULL: THE STONE SEAT OR BENCH TABLE FOUND BENEATH THE FLOOR OF THE CHURCH (A.D. 1300-1329).



Photo. by Messrs. Turner & Drinkwater, Hull.
 FIG. 17.—HOLY TRINITY CHURCH, HULL: S.W. PIER OF TOWER, LOOKING S.E., SHOWING GIRDERS, N. SIDE ONE ALREADY FIXED, THE SECOND ONE BEING THREADED THROUGH.

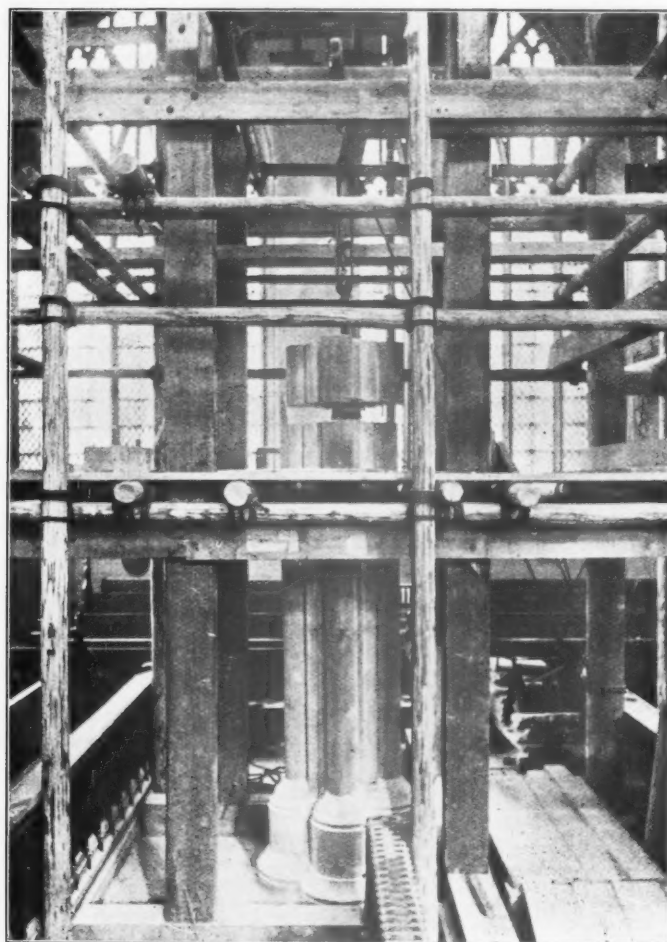
By means of the grouting machine these bridges can be saved for a fifth or even a tenth part of the cost of new ones, and can be made safe and strong enough to last another five hundred years.

A photograph [fig. 20] is shown of a road bridge over a stream in Westmorland which was in a very bad condition; the abutments were being undercut by the stream, some of the

arch stones had fallen out, and the arch and walls were badly cracked. This bridge has now been repaired by the machine, and, although delay and increased expense were incurred in consequence of the work being done during the winter and in flood time, the entire cost has been £50.

The celebrated "Auld Brig o' Ayr" is now in process of preservation, and the grouting machine plays an important part in the operations.

Two objections have been urged against the use of the grouting machine. The first is that the cement blown into a wall may afterwards expand and again crack the building. The answer to this is that cement which does swell or expand should never be used, whether with or without the machine, and that it can easily be detected beforehand by efficient inspection and tests. The second objection is that if such a high compression of air be used, the walls may be blown to pieces; but this is impossible, for

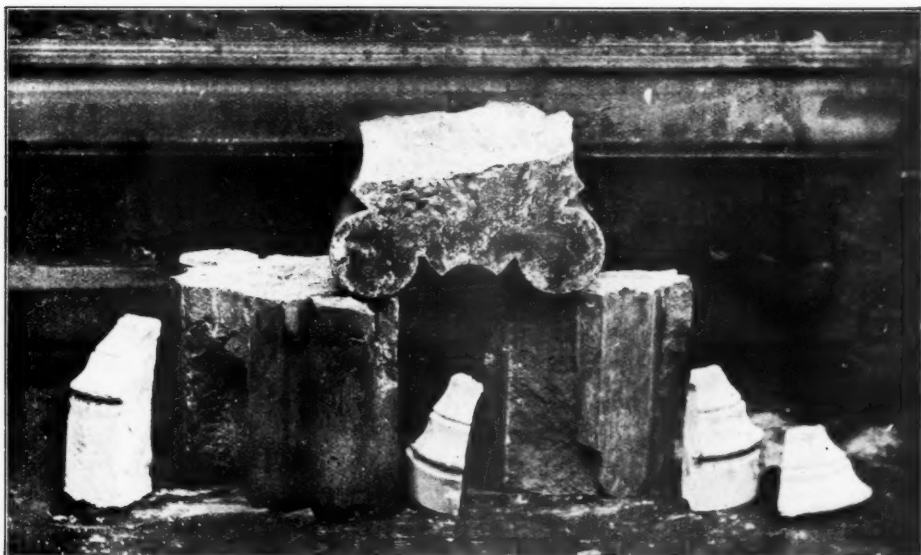


(Photo. by Messrs. Turner & Driskater, Hull.)

FIG. 18.—HOLY TRINITY CHURCH, HULL: TAKING DOWN ONE OF THE NAVE PILLARS, IN ORDER TO BUILD IT UP IN PERPENDICULAR POSITION.

although it is necessary to obtain penetration into the heart of the work by velocity, yet the safeguard is the use of the rubber hose which would very soon burst. In addition to this the clay pointing of the cracks would not sustain any heavy pressure, and would fall out.

My opinion, after long experience, is that the grouting machine in the hands of a



(Photo. by J. Ball.)

FIG. 19.—HOLY TRINITY CHURCH, HULL: PORTIONS OF NAVE PILARS FOUND TO BE BROKEN THROUGH; ALSO PATCHED STONES FIXED AT A FORMER RESTORATION OF THE CHURCH.

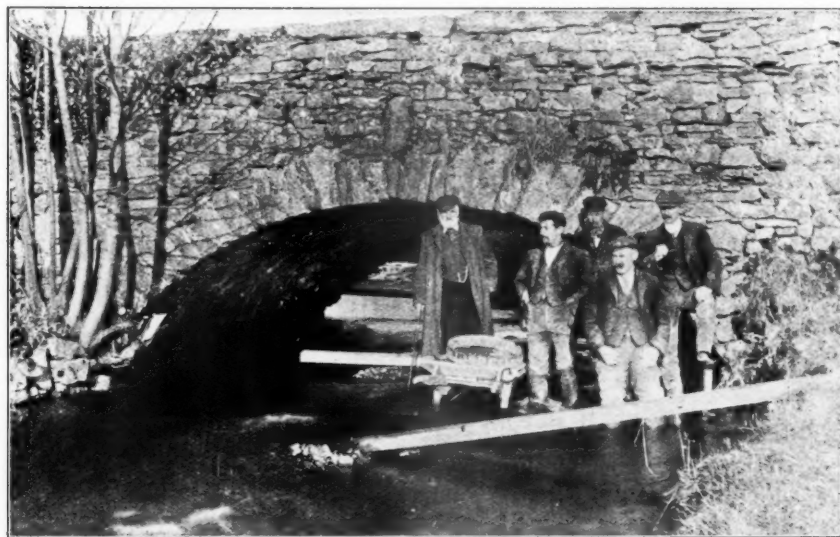


FIG. 20.—AN OLD BRIDGE IN WESTMORLAND, REPAIRED BY GROUTING MACHINE

practical man who knows how to employ it, is of unmixed advantage, and that no valid objection exists against its wholesale adoption.

In conclusion I venture to appeal to owners of property, and particularly to ladies, who are invariably interested in old buildings, to assist in this effort to preserve them for centuries to come.

NOTE ON CEMENT.

In using the grouting machine it is all-important that only cement of excellent quality should be used. It should not be quick-setting, as this tends to clog the machine and piping, and would if allowed to do so ruin both; nor should it be a cement which will expand to an appreciable extent in the work. This points to the necessity for submitting it (not only that which is used in the machine, but equally so that used in ordinary building) to the tests provided for in the standard specification. All kinds of natural cement, especially Belgian, should be absolutely condemned; for the author has been called in to advise on several buildings in which it had been employed with most disastrous results.

As regards burying steel girders in cement concrete, the author is of opinion, after long experience and many tests, that, if properly treated, the metal is indestructible when fixed above water level. What the eventual result may be below water level remains to be proved, and its history still has to be written; therefore for cathedral and church work he would not care to recommend its adoption.



BRIDGE OVER A CUMBERLAND RIVER, FOR THE PRESERVATION OF WHICH EFFORTS ARE BEING MADE.

DISCUSSION OF THE FOREGOING PAPER.

The President, Mr. THOMAS E. COLLCUTT, in the Chair.

MR. H. D. SEARLES-WOOD [*F.*], in proposing a vote of thanks to Mr. Fox for his most entertaining and able lecture, said it was a subject on which architects were extremely interested; if they had not good foundations, of course their buildings would not stand. With regard to the question of the bad cement which Mr. Fox had referred to, the Institute had been endeavouring to correct that in connection with the standardisation movement, and their solution of the difficulty was that all cement should be delivered in sealed bags with the name of the maker on the seal. At the present time they had no possible check upon the origin of the cement. If one watched a train being loaded up at cement works, one would find as many as twenty different names on the sacks being sent out from that particular factory. If the place of origin of the cement could be properly labelled on the sealed bag, then there would be no difficulty about the identification of the material that was being used. He hoped that every one present would support them in that movement. They were endeavouring to do it by means of the Chamber of Commerce. They had not been able to persuade the Standardisation Committee to take the subject up, because they were nearly all engineers on that Committee, and engineers used cement in such very large quantities that they did not realise the difficulties of architects who used it only in very small quantities. That was why they had not been able to get it put into a standard; but if they could get the support of the architects by means of the Chamber of Commerce, they would arrive at the same conclusion and get the material properly identified.

PROFESSOR BERESFORD PITE [*F.*] said they had had an exceedingly important and interesting Paper, if only on the ground of the extraordinary interest which Winchester Cathedral possessed for every architect and every Englishman. He should like to suggest what appeared to him to be the secret of the usefulness of the grouting machine. Our Saxon or early forefathers, he imagined, took the best row of field-stones or quarry bits they could find, and laid them on the approximate line of their foundations on both faces of the wall. The interior of the wall was a matter of indifference; it was filled in from face to face. That would be found from Saxon work onwards. The first difficulty to be faced in the construction of that wall was turning the corner, because more or less square or dressed stones would be weak on that angle. That led, of course, to the insertion

of the proper freestone coign, which in Saxon work was often long and short work*. Coming to the pier, the coign was used in the same way when they came to each angle, and thus came the well-known projections which gave them mouldings, and the fundamental shapes of the piers to be seen at Hull. This was the method of construction of the Hull pier and the Winchester pier. That, too, was the story of the front at Peterborough, the story of the central pier at Chichester, the story so plaintively told in Sir Gilbert Scott's memorials, where they read of his son being awoken up from his Sunday morning's sleep to be told that the stuff was falling out of a hole in the pier like water out of a bucket. It was simply the drying-up of this over-grouted rubble, because the original grout became dry, there being no cement in it. It was perfectly obvious that the settlements which came after the lapse of six, seven, or eight hundred years with the alteration of the water in the subsoil affected the wall from one face to the other, passing through the rubble core from dressed stone to dressed stone. Of course, in a cathedral like that at Winchester the whole of the exposed rubble surfaces had been replaced by ashlar, behind which there was in every cathedral, in every mediaeval building—indeed, in every Gothic building throughout the kingdom, right down to the end of the fifteenth century and even much later—abundant opportunity for the display of the virtues of Mr. Francis Fox's pet machine. The interiors of these walls in every case were hungry receptacles for tons of liquid cement, and it would be an infinite blessing if this could be applied wholesale. Experience only would show whether there might not be risks and dangers connected with it, and he was inclined to think that those risks and dangers were best left to the inventors of the machine to deal with. The vaults at Winchester were the most interesting set of vaults in England. In Winchester he believed they saw the leading example of the cross Norman vault built of rubble only. The vaults across the ends of the transepts were the most remarkable in England. They were all rubble, without dressed stone. They were semicircular, and the result was that the intersection was elliptical. It was difficult to talk about a vault of that sort being forced out of shape when it never had any shape. The accidental intersection of the two semicircular arches at right

* Professor Pite illustrated this portion of his remarks by drawings on the blackboard.

angles produced an elliptical curve which the Normans could not understand. He did not think a true elliptical arch was ever built in England in the Middle Ages. That elliptical intersection was, of course, a point of the very greatest weakness. There was no structural support, and it was that elliptical intersection which led to the use of the semicircular arching of dressed stones strung diagonally across to carry the weak angle of the rubble. The use of the semicircular arch on the diagonal to shore up the apex of the vault necessitated the use of a pointed arch on the transverse base, and it was this problem which had brought them face to face with pointed arches in this class of vaulting. One found them, for instance, in the aisles of Peterborough and Ely, and, for that matter, in all the other great Norman cathedrals. From that moment onwards, until the suspended tracery of Henry VII.'s Chapel at Westminster was obtained, the whole strength of mediæval vaulting was in the dressed stone rib. The filling never did any structural work, and if one bored a hole in one of these chalk fillings and found the whole lot of rubble come out of the pocket, one need not be surprised or afraid; there was no particular risk in it. The whole strength of the vault lay in the rib—as with an umbrella, as long as the ribs were sound, one could have it recovered as often as one liked. It had been an exceedingly interesting study to watch in the photographs of Winchester the extent of the failures of the ribs. In each case it was the rib that had been put out of shape, and it was necessary that the rib back should have some strength in it. He must confess to some sympathetic feeling with the old restorers who hung the ribs up to beams, because, if a thirteenth or fourteenth century vault were taken down and rebuilt to its true shape, the fifteenth-century work that lay above it was bound to be distorted. That was the practical difficulty of the architect; and where one had a magnificent superstructure of later work, as at Winchester, the risks connected with altering the *status quo*, to restore the *status quo ante*, were very considerable. These were the dangers with which they were face to face at Winchester. If blue brick together with the modern blessedness of cement and a squirt were properly applied to the walls of mediæval buildings, why should not any form of suspension applied to the back of these old ribs, however distorted, be possible, and be properly and logically applied in dealing with a deformity which had built upon it exceedingly beautiful work? That was the problem at Winchester, and no amount of restoration to the purely original form could be justified which brought one face to face with an alteration in the character—the historic character—and the age-long beauty that Winchester had acquired. That problem could no doubt be dealt with in a successful way; but he would suggest that if the

resources of modern science were justifiable in the interior of the wall, and in the basement of the foundation, they were equally justifiable if applied to the maintenance of these vaulted ribs. He had very much pleasure in supporting the vote of thanks for this exceedingly interesting, valuable, and, he hoped to be, widely spread Paper.

CANON RAWNSLEY, who rose at the invitation of the Chairman, said he could not tell them how much he hoped that what Mr. Fox had said would reach a very wide public, because in the Lake Country, and in Cumberland and Westmorland they were deeply interested in preserving what was certainly not one of the least important features of their valley roads, the beautiful bridges of the fifteenth, sixteenth, and seventeenth centuries. They were the result, almost always, he believed, of additions to the old pack-horse routes, and their beautiful curves had been preserved from the earliest times. They also felt, with Mr. Fox, that the dangers were very great of allowing these bridges to be put in the hands of people who did not know either the history of the country or care very much about the colour of the country. It would be found a great temptation to import easily worked red sandstone, for instance, into the neighbourhood from Annan and other parts of the country, which were entirely incongruous in colour with the beautiful volcanic ash of their hills; and this must happen in other parts of England. He urged, therefore, very strongly that, as far as possible, the bridges built of the native stone should be preserved as being more in harmony with the general colour of the country. It was felt that a good deal of poetry would be taken away from them if they allowed a new hand to come in and bring another country's material to make a bridge in their midst. If the ratepayers could be made to understand that their bridges, with all their curves and built of the stone of the district, could be saved at a very small cost, they would be certainly more inclined to pause before allowing the motorist, or the proprietors of heavy traction engines which naturally shook the bridges which were not built for these heavy vehicles, to alter these structures. The public, he thought, would generally be on the side of those like Mr. Fox who desired to conserve these beautiful bridges. He thanked them very much for allowing him to say these few words, and to urge that, as far as possible, this idea of really looking on the old bridges as part of the poetry and history of the past throughout the whole of their country should be considered, and they should do what they could to hand on to their children's children what John Ruskin called the great entail of beauty that had been left to them.

MR. GEORGE HUBBARD, F.S.A. [F.], said he thought there could be no doubt that every generation should be the trustee of the great monuments that had come down to them, and it was the sub-

sequent generations who would really accord to Mr. Fox their vote of thanks for the work he was doing, and which he had so beautifully illustrated before them that evening. Professor Beresford Pite's point, he thought, was a perfectly good one as regards the vaulting. There seemed no necessity to reinstate the vaulting so that it should have its original contour. By the injection of cement in the manner shown, the building practically became a monolith, and the correct outline or contour of the vaulting would not then much matter. He did not know if he was making his point clear, but what he meant was this: At the present moment the vaulting depended, though perhaps insecurely, upon the mutual support which each voussoir gave to its neighbour. If, instead of maintaining the principle on which the arch relied for its support, the vaulting were constructed out of the solid stone, the actual contour, or the line of the arch, was of small moment.

MR. MAX CLARKE [F.] said that a few months ago he had an inquiry as to where a grouting machine could be seen or heard of, and his reply was that the only thing he knew about it was that it was used at Winchester Cathedral. Now he felt satisfied that for the next inquirer he should only have to refer him to Mr. Fox. He should like to add his quota of praise for the most admirable illustrations shown them, because as a photographer himself he knew that some of these photographs had been taken under very difficult circumstances, and were really of great merit. One drawing thrown on the screen showed some transverse beams underneath the foundations at Winchester. He was there some eighteen months ago, after the works had been commenced, and the late Mr. Colson told him that no transverse beams had been discovered, but that the whole of the beams underneath the walls were laid parallel to the length of the wall. Perhaps Mr. Fox would throw some light on that point. He should also like to ask a question on a subject he was very much interested in. Mr. Fox had told them of a concrete floor which had failed, and he attributed the failure to the cement. He (the speaker) was joining issue with a very large number of people at the present time on that point, because he thought that in the great majority of cases the engineers and the architects had made rather a mistake in attributing the failures to the cement; he thought it more than probable that a large proportion of them were attributable

to the aggregate. He therefore would like to ask what the aggregate in the case referred to was composed of.

MR. FRANCIS FOX, replying to some of the points raised, said he was afraid he could not answer offhand the question about the aggregate or the cement; all he knew was, that they had taken blocks of concrete out of the floor and exposed them again to heat, so as to get the chemical action more rapid in the cement, and the concrete had swollen. They knew that it was made from what was called natural cement, which simply meant that nature had not worked to a true chemical analysis, and that the cement stone in one place was different from what it was in another, and consequently the natural product was a dangerous thing to use. Nothing would ever induce him to touch it. With regard to the logs in the foundations, they were generally transverse and not longitudinal, but in some few instances they were both ways. Concerning the stone ribs which were referred to, he was very sorry that Mr. Jackson, through ill-health, was not able to be present to answer the point; that was a matter over which he had entire control. He (Mr. Fox) could, however, say that when a rib was actually crushed it was not a question of holding it up with bolts and beams, but the crushed stone had to be removed, and he thought Mr. Jackson had acted wisely in what he had done.

THE PRESIDENT, in putting the vote of thanks, said that it seemed that Mr. Fox's great aim in life was to render the rotten cores of their cathedral walls into sound ones, and the work he was doing at Winchester in that direction was not only interesting, but was of the utmost value. He did not think one could have listened to a Paper on the subject of foundations delivered in a more interesting manner than Mr. Fox had delivered this. It had not only been very instructive, but it had been throughout most highly interesting. With regard to the question of bridges, he thought the Institute could take some credit for having used its influence towards the saving of some interesting bridges in the country. There were one or two instances where the Council had been able to assist Town Councils by their advice, and the bridges had been preserved as a result of their action.

The vote of thanks was then put and carried by acclamation.



9 CONDUIT STREET, LONDON, W., 22nd February 1908.

CHRONICLE

Mr. Francis Fox's Paper.

The unfavourable weather of Monday doubtless accounted for the comparatively small muster of members on the occasion of Mr. Francis Fox's Paper. Visitors, however, were numerous, and the room was consequently fairly full. Mr. Fox is a delightful lecturer; his interesting discourse, which was delivered with scarcely any reference to the printed copy before him, was interspersed with frequent humorous observations and anecdotes, and the hour and a half of its delivery passed quickly and most agreeably to the audience. The lantern illustrations, mainly photographs, some of them taken by flashlight far underground and in most difficult situations, were exceptionally good. An interesting exhibit was a model of the Great-head shield, the use of which led to the invention of the grouting machine; photographs of both machines in operation on one of the tube railways were projected on to the screen. The lecturer showed some interesting relics his excavations had brought to light from under the foundations of Winchester Cathedral and other old churches. These included a block from one of the oak logs on which rested the foundations of Holy Trinity Church, Hull [A.D. 1300], and blocks of the old beech logs on which the foundations of Winchester Cathedral were laid [A.D. 1202]. This old timber takes a capital polish, and a specimen slab shown by Mr. Fox, finely polished, and with the date 1202 cut upon it, suggests that the venerable old logs treated in this way might perhaps be turned to useful account in aid of the Cathedral Preservation Fund. Samples of peat and gravel from under the Winchester foundations were shown, together with cherry-stones, plum-stones, and apple-pips from the fruit eaten by the original builders, and found perfectly preserved in the upper surface of the peat. Of interest, too, were pieces of oak and fir cut from the piles which formed the foundation of the old Campanile of St. Mark, as sound to-day as when driven into the clay and watery sands of Venice over a thousand years ago.

The Prize Drawings for Exhibition in the Provinces.

The following selection from the premiated designs and drawings in the Institute Prize Competitions, together with some studies submitted by candidates for the Intermediate Examination, will be exhibited during the next few months under the auspices of the Allied Societies:—

The Royal Institute Silver Medal (Measured Drawings).—Drawings of Gran Guardia Vecchia, Verona (2 strainers), by Mr. Leslie Wilkinson (under motto "Sanmicheli"), awarded the Silver Medal and Ten Guineas; drawings of Porta del Palio, Verona (1 strainer), by Mr. Maurice Lyon (under motto "Sanmicheli").

The Soane Medallion.—Designs for a Customs House on a Quay: 3 strainers by Mr. George Drysdale (under motto "Free Trade"), awarded the Medallion and £100; 2 strainers by Mr. Adrian Berrington (under motto "Fabulosus") and 2 strainers by Mr. R. R. Prentice (under motto "Hang! I've forgotten the Motto!"), awarded Hon. Mention and Five Guineas each.

The Owen Jones Studentship.—Drawings by Mr. A. E. Martin (2 strainers), awarded the Certificate and £100.

The Pugin Studentship.—Drawings by Mr. Sidney G. Follett (3 strainers), awarded the Medal and £40; Drawings (1 strainer) by Mr. A. Winter Rose, awarded a Prize of Ten Guineas, and Mr. N. W. Hadwen (1 strainer), awarded Hon. Mention.

The Tite Prize.—Designs for an Open-Air Theatre: 2 strainers by Mr. George Drysdale (under motto "Yours truly"), awarded the Certificate and £30; 2 strainers by Mr. Anthony R. Barker (under motto "Balbus"), awarded a Medal of Merit and Ten Guineas; 1 strainer by Mr. T. L. Vesper (under motto "Dombey") and 1 strainer by Mr. Alan Binning (under motto "Panjandrum"), awarded Hon. Mention.

The Grissell Gold Medal.—Design for an Elevated Water Tank in Reinforced Concrete: 2 strainers by Mr. John H. Markham (under motto "A B C"), awarded the Medal and Ten Guineas.

The Arthur Cates Prize.—Drawings by Mr. Bryan Watson (2 strainers), awarded the Prize of Forty Guineas.

The Henry Saxon Snell Prize.—Design for a General Hospital suitable for a Provincial Town: 2 strainers by Mr. W. Milburn, jun., awarded the Prize of £60.

A selection of the Testimonies of Study submitted for the Intermediate Examination by Messrs. R. W. Atkey (2 sheets), J. E. Bullock (1 sheet), and J. H. Farrar (6 sheets).

Erratum.—In the review of the Prize Drawings, p. 223, fourth paragraph, Mr. Adrian Berrington should have been credited with Hon. Mention for the Soane Medallion. Mr. Alan Binning, whose name was given in error, received Hon. Mention for the Tite Prize. This correction is of course in accordance with the Deed of Award [p. 206].

The British School at Athens.

The Managing Committee of the British School at Athens have issued the following summary of the results yielded by the excavations in Laconia during the past session:—

Sanctuary of Artemis Orthia.—Great progress has been made with the work on this site. The plan of the Roman Theatre which was built for the use of spectators of the contests held in honour of Artemis Orthia can now be reconstructed with comparative certainty, and the proscenium has been found to be the front of a temple which probably dates back to the sixth century B.C. The interior of this temple and the arena have now been thoroughly excavated, and have yielded three strata of the Roman, Hellenistic, and Early Greek periods respectively, and three altars, probably corresponding in date with each period. The lowest stratum has proved very rich in archaic remains, such as early pottery, lead and terra-cotta figures, and some extremely interesting objects in ivory. The excavation and recording of these remains have involved a great deal of labour and care, but it is hoped that the results obtained will throw much light upon the history of early Spartan arts and handicrafts, about which hitherto little or nothing has been known.

The Ancient Walls.—The tracing of the walls of the city has been proceeded with, and their general course has been ascertained, mainly from the evidence of stamped tiles, as few stones remain *in situ*.

Sanctuary of Athena Chalkioikos.—The site of this sanctuary has been determined by the finding on the Acropolis of three roof tiles inscribed with the name of the goddess. The sanctuary, a very famous one in antiquity, was the scene of the death of the royal traitor Pausanias, who fled thither as a suppliant. Some Doric capitals and bronze nails, which most probably formed part of the building, have been found. The site has also yielded some interesting bronzes and pottery.

Plans for the present session.—It is intended to concentrate efforts chiefly on the Sanctuary of Artemis Orthia, where there is still much work to be done. An earlier temple than those yet excavated remains to be found, and further excavation will probably lead to the discovery of the Sanctuary of Eileithia, which is known from literature to have been near that of Orthia. Many other points connected with Spartan topography have still to be elucidated, and the sinking of trial pits in various localities will be proceeded with. A promising layer of geometric pottery on the Chalkioikos site will be excavated. It is also proposed to make preliminary trials with a view to discovering the sites of Helos and the Hyperteleteic Sanctuary.

The Committee feel that the selection of Sparta as a site for excavations has been amply justified by the interest and importance of the discoveries already made. Unfortunately, though every care

has been used in the expenditure of the money contributed, the Laconian Excavation Fund showed at the expiry of the School's financial year (2nd October last) a deficit of more than £40, and the cost of publishing the results obtained in the School Annual has entailed in addition a serious drain upon the resources of the School. The Committee hope most earnestly that further contributions will be forthcoming on a liberal scale to enable this most important task to be brought to a successful conclusion.

The excavations will be in the charge of the same able workers as last year, and the special knowledge and experience which they will bring to their work is a guarantee that any funds entrusted to them will be used to the best advantage.

It is intended to send out again special copies of the portion of the Annual which relates to the discoveries at Sparta to all who subscribe to this fund during the present session, and who do not, as subscribers to the general funds of the School, already receive the Annual itself.

The Committee appeal for £1,000 to enable them to continue the excavation work in Laconia. Subscriptions should be sent to the Hon. Treasurer, V. W. Yorke, Esq., The Farringdon Works, Shoe Lane, E.C.

Crosby Hall.

The Chartered Bank of India, Australia, and China is spending about £1,000 in the marking, removal, and storage of the historical portions of the building with a view to the re-erection of the Hall on another site. Several offers have been made from private sources to reconstruct the building outside the City: these, however, have been refused, as it is desired that the reconstruction should take place under the auspices of some public body. The cost of rebuilding would be about £3,000.

Building Mortars.

Mr. R. Gordon Nicol, harbour engineer, lecturing on "Building Mortars" at a recent meeting of the Aberdeen Architectural Association, observed that had it not been for the splendid stonework and mortars employed by the early architects few of their masterpieces would have survived at the present time. He classified the chief cementing materials used for mortars at the present day as pure limes, hydraulic limes, and cements, the term "hydraulic" being applied to a lime that sets or hardens under water as well as in the atmosphere. Caustic lime is the chief ingredient in each variety, but those which contain a percentage of clay in their composition before calcination or burning possess in a greater or less degree hydraulic properties, and produce the best and strongest mortars for building purposes. Common mortar is the mixture of pure lime with sand. It hardens by the absorption of carbon dioxide from the atmosphere, with formation of carbonate of lime, the

process of hardening being one of crystallisation. Having little or no hydraulicity, it is unsuitable for damp situations and foundations, and as the atmosphere rarely gets access to the interior of the masonry, it remains soft or merely dries without cementing value. The hydraulic mortars, on the other hand, have within themselves the whole of the ingredients necessary for crystallisation, and set hard in any situation. The limes that are sold in Aberdeen are high in caustic lime, and Mr. Nicol recommended that these should be increased in hydraulicity by the addition of Portland cement to the lime mortar immediately before use in the masonry. The lime mortar in Aberdeen is usually made in the proportions of one measure of lime to two or three measures of sand, and such mortar, if mixed with a small percentage of cement, shows great strength in a few days, where the mortar alone has little or no strength for a long period. Mr. Nicol explained a number of tests that had been carried out by him on new and old mortars in the city to discover the proportions of lime and sand actually used in these mortars. Analysis showed that the proportions in the older buildings were about one of lime to one of sand, whereas in some of the new buildings it was as high as one to three and a half.

The late Edward William Mountford [F].

MR. ALEXANDER GRAHAM, F.S.A., *Hon. Secretary*, at the General Meeting of the 17th inst., announced the sad news of Mr. Mountford's death in the following terms:—I have with great regret—a regret which is shared, I know, by every member of this Institute—to announce the loss of our esteemed colleague Edward William Mountford, who passed away on the 7th February, in his fifty-third year. You are all aware that some years ago, while in the prime of life and in the fulness of his capacity, he was stricken with an illness which continued with him until the close of his career. You may also be aware that, though physically incapable of continuing those services which he had rendered the Institute for so many years as a member of the Council, and of taking an active part in everything relating to the promotion of architecture, he was able during his long illness to take his part in the work he had been entrusted with, and it was permitted to him to see the conclusion of his principal work—the new Sessions House in the City of London. I think, Mr. President, that, as a mark of respect to our esteemed colleague, it would be well if we could arrange for a display of his drawings in this room on some evening this Session that may be found opportune. There would, I feel sure, be no difficulty in getting a collection of these drawings. Our late colleague, as you know, was a man of considerable individuality, and this individuality is very marked in all his works. He was also very keen in everything that

he did as regards strict conformity to what might be called the common-sense view of architecture—that is to say, soundness of construction. Therefore, I think it would be instructive and interesting not only to the older members, but also to the students, if a collection of his drawings could be got together at one of the evening meetings this Session. In conclusion, it is my official duty to move that a letter be sent to the widow and relatives expressing our sincere sympathy with them, not only in the loss they have sustained, but also in the long years of anxiety they have undergone during the illness of our late colleague, and at the same time expressing our sincere appreciation of his work and of his meritorious career as an architect. I move this formally, feeling assured you will allow such a letter to be sent on behalf of the Institute.

Professor BERESFORD PITE [F.], having asked leave to speak to the resolution, said:—The death of Mountford is a very serious loss to the Institute, it is a serious loss to the art of architecture, and I venture to suggest that it is a more serious loss to a large number of personal friends whom he made within the ranks of the Institute. Among those friends my brother and I can claim to be possibly the oldest in the profession, because Mountford was an articulated pupil of our father, and our knowledge of him probably extended a little before that period. All through his career I am sure—and I am only saying what everyone has felt who came in contact with him—that those who once knew him, and once felt that they had earned a place in his friendship, knew that nothing would ever happen to cool the sincere and earnest warmth of affection which everyone experienced who came to be one of his friends. Mountford's career was a very remarkable one. He was a man—I think I am speaking correctly in saying—with exceedingly few connections, a man who had to launch into life and to seek success unaided by the many auxiliaries which so often assist an architect. For some years after he had completed his educational course he had very little work to do, and he told me at one time that he contemplated taking up quantity surveying, but a steady perseverance in competitions gradually brought him to the point of achieving success almost as a habit, for when success began to fall to Mountford it fell frequently, one might almost say regularly, to his competition designs. I think the first success was a cottage hospital at Stratford-on-Avon—not a very important commission—but the success that he gained at Sheffield, I think in the year 1888 or thereabouts, was a very considerable success. A very difficult problem had to be faced in the planning of that building, and Mountford's design showed that he had what we must describe as a commonplace view of a difficult problem. He had the extraordinary faculty of reducing a problem which appeared to be difficult to commonplace simplicity and directness, and that absence of affectation which marked his life and

character, which marked everything he said, that simple directness, that almost genial bluntness of view, is expressed strikingly in his designs. None of his designs have any affectation of architectural splendour which does not arise directly and naturally out of the conditions of his design, and if you watch the connection of his plans and elevations I think the trace of his personality can be clearly seen. He attempted later in life more important architectural schemes with some amount of success, but there is always traceable in his work that enthusiastic love for the art of architecture which made one feel that the man enjoyed it. There were few things he enjoyed more than bringing his artistic friends and colleagues in the other arts, such as the art of sculpture, to work with him. He evidently felt that in working in fellowship with the sculptor and decorator he was exercising the best influence he could on the whole art of architecture for the benefit of his clients. Of course, that is shown very largely and very markedly in the great building in the City, where there has been a lavish if not glorious use of colour decoration and sculpture, which we hope is the precursor of similar combinations in great buildings. I had the pleasure of sitting with him on the Council of the Institute for many years, and around our board there was nobody whose gentle, humorous twinkle, whose clear, blunt English view of a difficulty could be enjoyed quite so thoroughly as his. You always knew where Mountford was; and the view he took of professional conduct, and of the relations one professional man should have to another, was always the view upon which he acted, a very high view indeed, and no one could have any doubt what line Mountford would take in any circumstances of difficulty. His work, without any doubt, will mark his generation. Although he has passed away prematurely, for his friends his was a full life, a life full of work, and a life full of influence, and the Mountford characteristics are undoubtedly the characteristics both in the education and practice of the generation he served. I venture very sincerely to support the resolution which the Honorary Secretary has proposed.

MR. H. D. SEARLES-WOOD [F.]: May I just add one or two words? I worked with Mr. Mountford as a colleague, and I found him in all things loyal and true-hearted; we never had a word of difference the whole time we were together. He was a sportsman in the best sense of the word; he played his game in professional life as a true sportsman, and never did a thing which anybody could be ashamed of.

THE PRESIDENT: It is not necessary for me to put this matter to the vote. A letter shall of course be sent on behalf of the Institute to the family of our lamented colleague in the terms suggested by Mr. Graham. It was my fortune to see Mr. Mountford for the last time in the large hall in the Sessions House. I had not seen him for some years, and it was very distressing to remark

how greatly his illness had changed him. There was, however, a certain satisfaction in remembering that one had seen him in the midst of his latest triumph, for the upper hall of the Sessions House is really a very noble room, and one can only say with regard to the decoration, especially the decoration at one end of the room which is entirely due to Mr. Mountford's selection, how very sensibly and how very highly he considered the sister arts of painting and sculpture. The painting in that room I look upon as a monument to Mr. Mountford's power of artistic discrimination, as showing that he knew how to select the proper men to carry out such work. The Sessions House is not only the latest, but, I think, is also the greatest work of our colleague.

Mr. Mountford was born at Shipton-on-Stour, Worcestershire, on 22nd September 1855. He was educated privately at Clevedon, Somerset, and was articled to Messrs. Habershon & Pite, architects, of Bloomsbury Square, in 1872. He began practising for himself in 1881, and in 1890 he obtained his first notable success, being placed first in the open competition for the Sheffield Town Hall. A complete list of his numerous important works is published in *The Builder* of the 15th February. Mr. Mountford took part in the recent competition for the new County Hall for London, being one of the eight architects invited by the London County Council to send in designs.

Mr. Mountford was elected Associate of the Institute in 1881, and Fellow in 1890. He served for fourteen years on the Institute Council, and was President of the Architectural Association from 1893 to 1895.

The late John Barnes Colson [F.]

Mr. John B. Colson, who died on the 21st ult. at the age of 57, was elected a Fellow of the Institute in 1892. He was born in Winchester, where his father—a fellow pupil of the late G. E. Street in the office of the late Owen Carter—practised as an architect, and held also the post of Architectural Surveyor to the Dean and Chapter of Winchester. Mr. J. B. Colson was in partnership with his father until the death of the latter in 1895, when, having acted as his deputy for some years, he succeeded him in the position of Surveyor to the capitular body. In 1896 Mr. Colson reported upon, and strongly urged that steps be taken for preserving, the vaulting of the nave of the Cathedral. This work was carried out under his superintendence, and by means of carefully designed supplemental roof trusses the crown of the vaulting was relieved of the weight thrown upon it by the sagging of the ancient tie-beams, owing to the fact that the various reconstructions of the roof in mediæval times had unduly weighted them. It was in consequence of the more recent

reports of their Surveyor that the Dean and Chapter undertook the extensive operations now in progress under the direction of Mr. T. G. Jackson, R.A., and Mr. Francis Fox as consulting engineer.

Among other works carried out under Mr. Colson's superintendence were several new churches in the diocese, besides additions to or reparations of old buildings. Among the latter Mr. Colson reported upon the defective foundations which were the causes of failure at St. Mary's, Cowes, Otterbourne Church, and Headbourne Worthy Church. He was also responsible for repairs at Odiham Church, the restoration of the decayed stonework at St. Thomas's Church, Newport, Isle of Wight, and the new tower and spire at Christ Church, Winchester. He quite lately prepared designs for a church to be built at Carisbrook, New Mexico, U.S.A., for the English colony there.

One of his most recent works was the enlargement, by the addition of a new nave and chancel on the south side, of the Church of All Saints, Compton, near his own home, and in the quiet graveyard of which he was laid to rest. In this work he was associated with Mr. G. H. Kitchin, a fellow parishioner, as joint architect.

In his capacity as an official of the capitular body Mr. Colson was frequently called upon to organise the seating or processional arrangements on the occasion of important functions at the Cathedral. These have included the enthronements of three bishops, the funeral of Bishop Thorold, the special services in connection with the octocentenary of the Cathedral's dedication and the celebration of the millenary of King Alfred. In his younger days Mr. Colson was a keen volunteer; he was one of the best shots in the 1st Vol. Batt. Hants Regt., and won many prizes at the N.R.A. and the county rifle meetings. He took a great interest in local parish matters, and was both a churchwarden and chairman of the Compton Parish Council at the time of his death.

The late Sir James Knowles [F].

Sir James Knowles, K.C.V.O., the distinguished founder, proprietor, and editor of the *Nineteenth Century*, who died on the 18th inst., had been a member of the Institute nearly fifty-five years, joining as Associate in 1853, and proceeding to the Fellowship in 1876. He was born in 1831, was educated at University College, and entered the office of his father, the late J. T. Knowles, a Fellow of the Institute and Member of the Council. As a practising architect his career was one of promise, and he enjoyed some distinguished patronage. His principal architectural works included the Thatched House Club; Aldworth, for the late Lord Tennyson; and Kensington House, for the late Baron Grant—this building was pulled down after the Baron's bankruptcy, and Kensington Court now occupies the site. He also laid out the public garden in Leicester Square and designed

the fountain. The success Sir James achieved in quite a different vocation is well told in *The Times* obituary column of the 14th inst.: "Though he was himself neither a scholar, nor a writer, nor a philosopher, nor a debater, he was keenly alive to the interest attaching to the things of the mind; and he enjoyed nothing so much as to bring clever men together and hear them discuss the serious problems of life. Hence arose his first memorable creation, the Metaphysical Society, in which men like Huxley on the one side and Cardinal Manning on the other met on neutral ground, and quite amicably fought the battles of thought. This society was born in 1869, and next year Knowles definitely came before the world as an editor, his first organ being the *Contemporary Review*. This he conducted from 1870 to 1877, when he and the proprietors parted company, and he made the great venture of his life, which soon brought him both fame and fortune—the *Nineteenth Century*. From the beginning this was a great success, for it was carried on by a man who, whatever his limitations, combined in a remarkable way a sense of what interested the educated public with the keen eye of the man of business. Knowles's two great supporters were Tennyson and Gladstone, and both helped him to make the first number of the new review the most weighty, and the most attractive, that periodical literature had seen for many a long day." Sir James received the K.C.V.O. from His Majesty during a visit to Sandringham in 1903.

Honours and Appointments.

At the distribution by the Italian Ambassador of the awards of the Milan International Exhibition of 1906, the following architects were among the recipients of honours: Mr. C. Harrison Townsend [F.] (juror), Diploma di Benemerenzia; Mr. Edwin T. Hall [F.], two gold medals; Mr. H. Percy Adams [F.], gold medal.

The Secretary of State for India has sanctioned the appointment of Consulting Architect to the Government of India as a permanent arrangement, and Mr. John Begg [F.] will be the first holder of the permanent office.

Mr. Norman C. H. Nisbett [A.] has been appointed Architectural Surveyor to the Dean and Chapter of Winchester, in succession to the late Mr. J. B. Colson, his former partner.

Sir A. Brumwell Thomas [F.] has been appointed Hon. Architect to the National Society of Day Nurseries.

At the last meeting of the Estates Governors of Dulwich College Mr. Edwin T. Hall [F.] was elected Chairman.

It was omitted to be mentioned in the last number of the *JOURNAL* that the photographs of the Grinling Gibbons carving reproduced on pp. 433-36 are the copyright of Messrs. H. H. Martyn & Co., of Cheltenham.

COMPETITIONS.

Pontypridd Union Offices.

The conditions of this competition being wholly unsatisfactory, members are requested not to take part in it.

EDMUND WIMPERIS,
Hon. Sec. Competitions Committee.

LEGAL.

Architects' Remuneration: The Institute Scale.

In the King's Bench Division on the 18th inst., before Mr. Muir Mackenzie, Official Referee, judgment was given in the case of *Horton v. Hensley*, which raised the question as to whether the scale of remuneration for an architect as laid down by the Royal Institute of British Architects was a binding scale in all cases in the absence of a special agreement. The plaintiff was an architect, and claimed remuneration for designing and supervising the construction of a large building which the defendant was erecting, and compensation for the discontinuance of his employment, to the amount of £6,000. The defendant pleaded that he was justified in discontinuing the contract, as the plaintiff had failed in several ways to fulfil his obligations as an architect, and, further, that the plaintiff had already been sufficiently remunerated by £1,000 already paid to him, or, in the alternative, by that sum and a further sum of £760 which the defendant paid into Court.

The case is reported in *The Times* of the 17th inst.

Mr. Muir Mackenzie, in delivering judgment, pointed out that the circumstances of the plaintiff's employment were not quite ordinary, since in this case he had not, after preparing the plans, to act as the defendant's agent in supervising the work of an independent builder, for the defendant was himself an experienced builder, and was to have the plaintiff's plans prepared and submitted to him, when the defendant was to obtain contracts for some parts of the work, and other parts he was to carry out himself. In fact the plaintiff was rather to take directions than to give them. The several allegations made in the defence that the plaintiff had not complied with his obligations as an architect were dealt with in detail, and judgment was given in favour of the plaintiff on those issues. As regards the proper scale of remuneration to which the plaintiff was entitled, Mr. Muir Mackenzie said that the general rule was as follows:—If, after part performance of his work by an architect, the employer refuses to continue the contract of employment, the architect can recover all sums due for services rendered before refusal, and for what he has lost by not being permitted to complete the contract of employment; or the architect may treat the contract as rescinded, and recover the value of the services he has rendered. Continuing, Mr. Muir Mackenzie said that the plaintiff alleged that, in addition to some charges for extra work by reason of the defendant's refusal to go on with the contract of employment, he was entitled to remuneration on the scale prescribed by the Royal Institute of British Architects, as applied to the special circumstances of the case, and in effect contended that a jury, or referee, is bound to award remuneration on this basis, notwithstanding that on the evidence, and in the opinion of the jury or referee, the value of his services rendered is less in amount. The Judges, in directing juries, have repeatedly declined to be bound by this rule, unless this scale of remuneration has been expressly consented to, or it has been established that the owner has known that in employing the architect he would be charged in accordance

with this scale. Lord Chief Justice Coleridge in *Burr v. Ridout* (*The Times*, 22nd February 1893) said:—"You may adopt the scale if it would be a fair remuneration or compensation, but not as a binding scale; to do otherwise would be to allow the architects to tax their own charges." In *Gwyther v. Gage* (Hudson, Vol. II., p. 21) the scale would have given the architect in the circumstances of that case 2½ per cent. The Judge awarded a sum which worked out at 1½ per cent. The plaintiff here claims, by applying the scale, a sum equal to 4 per cent. on £122,500, together with some extra charges. I do not adopt that scale for two reasons. In ordinary circumstances, having regard to the fact that the defendant had built a large building in London before, and probably knew, or at any rate must be taken to have known, the scale on which architects base their charges, I should have been disposed to find that the defendant acquiesced in the scale so far as applicable. But in this case the defendant, as I find, never intended to be bound by the charges of the scale in employing the plaintiff. The plaintiff had offered to do all the work for a remuneration at 3½ per cent., and the defendant did not agree to employ him at a higher rate. Secondly, the scale, in the manner in which the plaintiff seeks to apply it, awards him a remuneration in excess of what is reasonable or just in the circumstances. Further, whatever rate is to be applied, it cannot be based on £122,500, being the estimated cost of the building. That sum may be the proper cost of the building as designed by the plaintiff; but the works were not carried out under a contract with a builder for a specified sum, and the defendant had a right during the progress of the work to make alterations for the purpose of reducing the cost. The learned Official Referee found that 3½ per cent. on the cost of the entire work, which he estimated at £90,000, was an adequate and sufficient remuneration and compensation in the circumstances of the case; and judgment for that amount, less the £1,000 already paid and the £760 paid into Court, was entered for the plaintiff accordingly.

MINUTES. VIII.

At the Eighth General Meeting (Ordinary) of the Session 1907-08, held Monday, 17th February 1908, at 8 p.m.—Present: Mr. Thomas E. Colclutt, *President*, in the Chair; 30 Fellows (including 10 members of the Council), 31 Associates (including 1 member of the Council), 1 Hon. Associate, and numerous visitors—the Minutes of the Meeting held 3rd February [p. 238] were taken as read and signed as correct.

The decease was announced of Sir James Knowles, *Fellow*; and Professor Meldahl, of Copenhagen, *Hon. Corr. Member*.

The decease was also announced of Edward William Mountford, *Fellow*, and reference having been made by various members to the personal worth of the deceased, and the high quality of his work, it was resolved, on the motion of the Hon. Secretary, that a letter be sent to the widow and relatives of the late Fellow, condoling with them in their bereavement and in the anxiety his long illness had caused them, and expressing appreciation of his work and of his meritorious career as an architect.

The following Associate attending for the first time since his election was formally admitted by the President—viz. Walter Godfrey Green.

A Paper by Mr. Francis Fox on FOUNDATIONS, THE USE OF DYERS AND THE GROUTING MACHINE, having been read and illustrated, the subject was discussed, and a vote of thanks was passed to the author by acclamation.

The proceedings then closed, and the Meeting separated at 10 p.m.

R R

REVIEWS.

TOWERS AND SPIRES.

Towers and Spires: their Design and Arrangement. By E. Tyrrell Green, M.A., Professor of Hebrew and Theology and Lecturer in Architecture at St. David's College, Lampeter. With 129 Illustrations from Pen-and-ink Drawings by the Author, and 2 Maps. 80. Lond. 1908. Price 10s. 6d. [Wells Gardner, Darton, & Co., Ltd., 3 Paternoster Buildings, E.C.]

This is a pleasant-looking book of 294 pages, well printed on good paper, light in the hand, containing 129 illustrations from pen-and-ink drawings by the author, and properly indexed. Its real scope is far less extensive than the title: it professes to deal with all towers and spires, but really it is mainly a description of examples existing in England and Normandy, with the addition of some from other parts of France and the Netherlands and a few from Germany and Italy, Spain and Portugal do not appear to be credited with the possession of towers and spires. A scientific and comprehensive treatment of the whole subject would be very welcome. To such a treatment the present volume makes no pretence—e.g. very many Romanesque towers in France are referred to, but there is no attempt to divide them into schools, though there exists an admirable article by Viollet-le-Duc on the schools of tower-builders. Nor, again, are the relations of tower design to the schools of Continental Romanesque set forth. The architectural provinces of Continental Romanesque have been demarcated by M. Anthyme St. Paul, M. Choisy, Professor Dehio, and others, and the characteristic tower design of each school may now be made out with but little difficulty. Moreover, like the handbooks of Gothic architecture that have so long held the field, architecture is almost wholly dissociated from building construction; e.g. the octagonal central tower is discussed, but no attempt is made to co-ordinate its form with the presence below of a masonry dome resting on eight supports—four walls and four squinches or pendentives. Our old friend the "Byzantine" is dragged in—this time into Ireland to build round towers. Like that blessed word "Mesopotamia," it is a name to conjure with. But one would like to know where he landed and where he sailed from; how was it that he came at all; whether the Irish welcomed him with triumphal arches, or, *more Hibernico*, smote him on the head with a fylfot or a swastika. Why employ Byzantines to carry round towers from Ravenna? The wild Irish of the tenth century built round towers simply because they could not build square ones, not having learnt yet to dress stone—the early round towers of Ireland being constructed with rough field stones untouched by hammer or chisel, not rounded, but fitted by their length to the curve of the wall, wide-jointed, with small stones fitted into the interstices. So,

again, quite in the old-fashioned way, we read that "the Gothic style had reached its culminating point in the fifteenth century, and decay had already set in." This is just the kind of thing Mr. John Ruskin would have said, adding in a second edition, "This is nonsense." It is as who should judge a man by his buttons, and should assert that decay had already set in because he had developed his muscles to such an extent as to burst his buttons. If people would study Gothic building construction instead of Gothic architecture, they would find that, so far from decay having set in, vast developments were in the air, hardly realised at the time, still to be realised by Gothic constructors who will take the trouble to study Gothic construction *au fond*. Nevertheless, do not let me be supposed to say that the book has not considerable merits: it is clearly written and interesting, and puts together a great number of facts. The illustrations are numerous, and many of them are good. One thing we might mention. At Fécamp, Louth, and Woolpit—the latter, by the way, is modern—the tower or spires are shown with a marked list to the north. Are we to understand that this is an "intentional refinement"? Or shall we rather accept the symbolic parallel of the deviation to the north of the axis of chancels?

FRANCIS BOND [H.A.].

HERALDRY.

Heraldry as Art. By G. W. Eve. La. 80. 1907. Price 12s. 6d. [B. T. Patsford, 94 High Holborn.]

Heraldry has been aptly and pithily described as "the symbol of a name." It is, or should be, both an Art and a Science, but there is often among the best-intentioned of its delineators a temptation to separate the two. This, however, should be an impossibility: the two attributes *must* go hand in hand. This book, well and logically written, artistically illustrated, printed, and got-up, does not greatly err as to that point: there are some violations of it, specifically avoided in the introductory remarks, by the use or abuse of shields charged with crests, helms, and mantles (pp. 220–221); here the science is somewhat ignored for the sake of the art. "Decorated" shields, however beautiful, cannot consistently be defended, being opposed to the scientific side of heraldry altogether; crests, helms, and letters have no right to be there, and even for "badges," so far as I know, there is no ancient authority for their appearance on a shield, though they may *per se* be heraldic "charges." The book gives examples of, and in, all sorts, sizes, styles, dates, and materials, and so supplies a long-felt want. As "Art" it can in no sense be said to belie its title. The "science of fools" has the sting removed when the diligent student can readily assure himself that it takes a wise man to make one! A very wide field of investigation has evidently been traversed at the author's hands, and

the cost brings it within the reach of such who may seek for guidance of a practical kind in dealing with its manifold possibilities.

No mention is made of a talented but much-forgotten delineator of heraldry, the late John Cleghorn, who died at a very advanced age, working to the last; his woodcuts in *Shirley's Noble and Gentle Men of England*, and many another fine book, are specimens of good heraldry combined with good design. I have in my possession many beautiful India proofs of his delicate, correct, microscopic, and most artistic work. There is also unrepresented the work of Miss Sophia B. Moule, whose woodcuts, illustrating her father's well-known book, the *Heraldry of Fish*, 1842, are hard to beat. While alluding to the "trick of arms," those in Dugdale's *Warwickshire* deserve some mention as well in advance of their time.

The diagrams (p. 83) are of much value, suggesting, as they do, a good way of covering the field of a coat-of-arms, a point sorely missed in much modern work. Excellent practical examples (pp. 131-2) for avoiding absurd treatment of the crest are given. The crest is often out of all scale with the helm supporting it. The "impossibility" of much modern heraldry is well and correctly stated by Mr. Eve. I question the correctness of fig. 239, described as Beaumont: it is the Royal coat in a bordure; that of Beaumont is "azure, semée de lys, and a lion rampant or." The tomb at King's Langley is fraught with the best possible suggestions for treating modern work, being not only good heraldry but good design too. The De Brewys Brass (p. 184) might well inspire towards a design for a successful modern one, of which we have none too many; so also may the armorial wood carving at "the Vyne," near Basingstoke (p. 211), give full inspiration of a noble kind towards satisfactory modern work. The bed-cover (p. 264) is very beautiful and appropriate. The remarks about the superiority of the "Tilting Helm" over the more modern forms are singularly naïve and *à propos*. The French examples from Blois, and certainly no less one from the Percy shrine at Beverley, give us a mine of suggestion as to what may be safely taken into account in our studies of the very best.

Pugin's designs for heraldry in glass, by whomsoever worked out, need no defending; there is little if any modern design better as a whole than his. The heroic De Bohun Swan combines the bird as he is with the bird as he was with great fidelity both to art and nature; and though the tusks of "the pig" may be a trifle long, they are, I believe, not without precedent. The production of these cartoons from the Houses of Parliament is of immense value to the draughtsman, nor are the designs at all at variance with the traceries in which they occur. Other good modern examples in glass, by the late James Bell, are to be found in the great hall of the Law Courts.

The wonderful heraldries in bronze around the

tomb of Kaiser Max at Innsbruck, in the cathedral of Mainz, in the glass of the north side of Cologne Cathedral, at Rothenburg, Prague, Nuremberg, and very many other cities, so full as they are of fine old examples, will furnish Mr. Eve with ample materials for a second volume.

German heraldic design, suitable as it undoubtedly is for its own work, is often rather inclined to become "sprawly" and over-pictorial when applied to our own phase of the science, unless our limitations are duly guarded against; but this, with a little care and arrangement, may readily be done. Malvern Priory Church would alone supply what is lacking as to the right use of design, so far as tile-work goes; recent alternative fads have somewhat put them out of court as floorings.

The fireplace, "the altar of the home," is one of the best positions for a worthy display of good heraldry.

The so-called "ducal" coronet, described by Boutell as a "crest-coronet," and the "lion of England," a term used for brevity's sake, are both heraldic rather than titular distinctions. As charges in decoration heraldic forms and colours are always satisfactory, because full of meaning; they are also always right in principle as to colour-effect, whether as colour decorations, carvings, or fabrics, when rightly done; they never fail to interest and satisfy both possessor and spectator, and their embodied sense of mystery is an added charm; like music, they seem to secure the greater reverence from those who are but partly initiated into their secrets.

Burges's shields at Cardiff Castle, Nesfield's heraldries at Combe Abbey and elsewhere; the fine coats at Arundel Castle; the works of the late John Bentley, the late G. F. Bodley, and Mr. J. N. Comper; Mr. St. John Hope's book on the Garter plates at Windsor, and Mr. Forbes Nixon in *Foster's Peerage*—all go to show clearly that neither as art nor science is heraldry yet defunct. In a small way, too, I have done what I could, and would strive to do more had I the opportunity.

Those who are the greatest boasters are frequently those whose family evidences are of the very youngest and most meagre, and their landed estates (the *old* test of position) *nil*. Even they who have lost all are treated by such as those who never had. The thankfulness to Providence for such blessings is apparently non-existent nowadays; but this was not the mediæval method. What a man has, rather than what he is, is the general standard of rank now. It is somewhat singular that those best entitled to bear arms are shy at doing so, as if something more to be ashamed of than thankful for. Our German neighbours, on the contrary, see nothing incongruous in it. Why should they?

Mr. Eve's book has but to be well studied and carefully read: when this has been done, it can

hardly fail to be fully enjoyed and appreciated alike by the student as by the seasoned, but not case-hardened, herald himself. Of course a work of this nature cannot claim to be entirely novel; one must tell again what other authors have already told us.

Scientific heraldry is often correct but ugly, and artistic heraldry is likewise beautiful in form, line, and colour, but may at the same time be incorrect from the scientific standpoint. Liberty must never degenerate into license, nor should occasional accidents of that nature in a few old and obscure examples be quoted as precedents; in the words of Shakespeare, "A friendly eye could never see such faults; A flatterer's would not, though they do appear as huge as high Olympus." "Religion" was quite as closely connected with the twofold character of heraldry as ever was "family pride." Indeed, in old days both art and science were much connected with "faith." They are less so now.

Finally, the works fully gone into and described, as well in form and line as in material, stone, marble, metal, wood, glass, enamel, fabric, cannot but secure much gratitude for the obvious benefits conferred on the workers in such materials by this essentially practical essay; broadcast examples, from the best sources, early and late, are abundant. To such of us who have at all studied the heraldries of the Continent—e.g. France, Germany, Belgium, Holland, Spain, and especially Austria—but one conclusion can be arrived at, that each of these nations has its own special point of excellence. Our French neighbours have been pretty keen, inasmuch as, so far back as the year 1837, two volumes, by M. Rey, on the fleur-de-lys alone had appeared.

Therefore Mr. Eve's book should not only be well read, but should do very much towards the fostering of others, and so continue the demand for and the supply of those charms in a subject practically inexhaustible. May he, for one, be induced to give us at a future time some further evidences of his skill and taste!

E. SWINFEN HARRIS [F.].

SCHOOL BUILDINGS.

Les Constructions Scolaires en Suisse, Écoles Infantines, Primaires, Secondaires, Salles de Gymnastique, Mobilier, Hygiène, Décoration, &c., &c. Par Henry Baudin, Architecte. 40. Geneva. 1907. [6 rue Saint-Ours, Geneva.]

This volume may be said to be one of the most complete works of its kind published in any country. To the English student the fact of its being written in French must naturally create a certain drawback, but when this has been said, all has been said, as the exceptionally fine illustrations in the majority of cases go far to explain what the author wishes to bring home in his text.

That M. Baudin has treated his subject in an

exhaustive manner a glance at his work will show. The buildings of his own country naturally take precedence, but in describing these he has not overlooked comparison with the works of other lands; and the chapter "Plans comparatifs d'écoles de divers pays," page 131, is full of interest and information to all who are called upon to devise new methods or suggestions in planning the buildings now being erected in this country for the purposes of elementary education.

What strikes one more than anything when reading M. Baudin's work is that English planning, although possibly still somewhat behind-hand as regards certain points—such as the incorporation of the spray-bath, the grandiose appearance of the entrance-hall and corridor, and such rooms as kitchens, music-rooms, and art-rooms—is otherwise superior and more workman-like in its placing of the entrances, the cloak-rooms, and the offices, especially the latter, which in the majority of Swiss schools are to be found within the building, and without efficient cross-ventilation as understood in this country.

I think that architects are to be congratulated upon having such a book to refer to, and that M. Baudin deserves our best thanks in undertaking such a work, thus giving us a further opportunity for obtaining much fresh information upon a subject which is of the first importance at the present moment.

ARTHUR H. RYAN TENISON [F.].

BACK TO THE BACK LAND.

Town-planning in Theory and Practice. Papers and Speeches by Various Authors. Price 1s. net. [The Garden City Association, 602-3 Birkbeck Bank Chambers, Holborn, W.C.]

This little book is a report of a Conference held at the Guildhall last October. It consists of the speeches delivered at that Conference, four Appendices, and an Introduction by Mr. Ewart G. Culpin, Secretary to the Garden City Association.

In the Introduction it appears that there are no opponents to town-planning, which is surprising; and that small boys who go unwillingly to Council schools (type C) are not so big for their ages as small boys who go equally unwillingly to Higher Grade schools, which is not surprising considering that in all probability the former are underfed, while the latter eat too much. The weight of schoolboys and other statistics, however, are here quoted in view of their bearing on town-planning, and the idea appears to be that even if children have not enough food they must have enough air. Very well. Let municipal land purchase, municipal town-planning, and municipal housing supply that air, and thus "rear a future generation of the John Bull type." Every sympathy is due to any effort to improve the condition of the poor, but of course

John Bull was not bred in garden cities or in municipal cottages (third class) estimated to cost £150, not including architects' fees, builders' profit, fences, fixtures, &c.

Turning to the Conference, it was opened by the Lord Mayor and attended by large numbers of men who have thrown, and will continue to throw, their keenest thought, profoundest knowledge, and most generous sympathies into a fight against the dirt, disease, and demoralisation which is to be found in all our great cities. The resolution before the Meeting was as follows:—

That this meeting of municipal and local authorities and societies and others interested in Housing Reform and Town-planning, affirms its belief that the present planless and haphazard extension of towns is detrimental to the best interests of the nation, inasmuch as, by the creation of new slums and overcrowding, it produces mental, moral, and physical degeneration, and is also burdensome to the ratepayers; it therefore calls upon all parties to welcome the Government's promise of legislation upon the matter. This meeting urges, also, the great advantages which would result if, wherever possible, a belt of agricultural land could be retained around or in the neighbourhood of any new suburb or town which may be built to relieve the congestion of the urban population. It would further urge the importance of dealing with the problem of rural housing.

The promise of legislation here welcomed was reiterated in the King's Speech the other day in the following terms:—A Bill "to amend the Acts relating to the Housing of the Working Classes, and to regulate the laying-out of land needed for the development of growing urban centres."

In moving this resolution Mr. J. S. Nettlefold predicted that the promised legislation would be designed to "encourage, assist, and control . . . our most important native industry," as he very aptly styled the building trade. "The operations," he remarked, "of this body of house-builders are at least ten times as large as those of all the semi-philanthropic societies and local authorities put together." But these operations are hampered by "the waste now caused by inelastic by-laws," with which most of us will agree. Moreover, one may hazard the opinion that they are further checked, if not stopped, by semi-philanthropic and municipal competition. That opinion is quite by the way, but it may serve to indicate a cause of the housing difficulty, and perhaps to hint at a possible solution.

The same speaker gives a picture of town-planning in full swing, which is full of detail but not quite clear:—

A town-extension plan contemplates and provides for the development as a whole of every urban, suburban, and rural area likely to be built upon during the next thirty or fifty years. Wide avenues are provided for the main traffic between the centres and the outskirts, narrower streets for ordinary traffic, and again narrower and less expensive roads or drives for purely residential quarters. Parks and small open spaces and playgrounds are provided for beforehand, instead of waiting till the land required has risen to an impossible price, and in a sensible plan these lungs are

located on back land, not on valuable frontage, as is so often the case to-day in this country. Districts are allocated for factories on the opposite side of the town to that from which the prevailing winds come, and here there are railway lines, and where possible, water communications. The future town is divided into zones, high buildings close to each other are allowed in the centre and on main arteries. In residential districts buildings must be lower and more dispersed the further they are from the centre of the city or its main arteries.

In order to accomplish all this the population which now occupies one million acres should spread itself over the thirty million acres available. The order of the day is to be centrifugalisation. A rather tall order, but somehow Mr. Nettlefold's picture seems broadly to tally with the natural development evidenced in most existing cities, excepting that there are no slums.

Unfortunately, there seems to be more demand for slums than for fresh air. Some of the very poor simply will not live in workhouses, almshouses, artisans' dwellings, municipal cottages, or anywhere else, excepting the ordinary buildings and lodgings supplied by the market in the ordinary way. Perhaps this is due to a touch of spirit in the slums, but that is no reason why the poor should object to fresh air. The fact remains, however, that one seldom sees a cottage window open.

The discussion which followed dealt, not only with town-planning, but with municipal land purchase, housing the working classes, amending the by-laws, Government loans, school buildings, small holdings, the Traffic Commission, the preservation of historic buildings, and other kindred matters.

Everything in the book is, or is intended to be, in favour of the resolution, but much confusion of ideas is noticeable. Through it all, however, there is a pitiable attempt to prove that the great reforms which are advocated can somehow be obtained for nothing. This being so, it is refreshing to come to the frank, common-sense of Mr. H. Rider Haggard. He will pay landowners a fair price for the lands required, only he will not ask cottagers to pay a fair rent. He will drop upon the Exchequer for some of it—which course he tries to justify on the ground of Imperial duty. His experience is that "cottages are not built because it does not pay to build cottages," excepting that "landowners do provide sufficient cottages for their own people." From which it may be gathered that those people are worth housing, and thus pay their rent in kind or take part of their wages in kind.

Some interesting points were mentioned by Mr. T. C. Horsfall, the author of *The Example of Germany*, and among them the fact that England, the United States, and France were the only civilised countries which had not town-planning such as existed in Germany. Be that as it may, most people will agree that France has got along very well without it; and as for the Americans, one may not like their plan, but they certainly have a plan—a plan stretching far over the prairie

where I well remember seeing city blocks marked only by vegetated quadrant kerbstones. There, indeed, "lines are fixed for streets to meet the foreseen needs of the future," but those lines show neither beauty nor intelligence. It should be encouraging to architects to find that so influential a meeting is held to point out the advantages of intelligent planning, and that reciprocity of confidence is established between architects and town reformers.

The R.I.B.A. was ably represented by Sir Aston Webb, who spoke of the work of the Towns Planning Committee, and said that the Royal Institute was entirely in accord with the resolution; but he very properly added that "the legislative side of the question and the powers for carrying it out were, of course, not within their province." It is clear that something is rotten and that something must be done, and this is nowhere more vividly expressed than by Sir Aston:—

All agreed that these insanitary areas should be removed; all knew that at the present time enormous sums were being spent in clearing away these insanitary areas; and yet they saw being created under their eyes and noses similar insanitary areas a little further out of town. They all knew that the next generation would have to spend large sums in order to clear these out, with the result that they would merely go a little further, and the next generation would be put to the same cost over again. That surely was not a right way of dealing with so important a matter.

One sincerely hopes that a right way will be found, but the procedure suggested by Mr. Thomas Adams and other delegates does not strike one as fair. It is something of this nature:—

- Restrict the number of houses per acre to reduce the value of the land adjoining towns.
- Buy the land thus depreciated compulsorily, but without compensation for compulsion.
- Borrow the money on the eighty years' system at rates of interest below market prices.
- Lay out narrow roads and open spaces on back land.
- Erect cottages and let them at a loss.
- Pay no taxes.
- Attract the population from the old town, and thus convert every slum into a slump.
- End the old houses at the expense of their owners, and thus ruin the people who have been rated and taxed to produce the money to carry the scheme through.

Nor does it seem to be fair to lay out the land on extravagant lines for landlords, whether they like it or not. Mr. P. Thomas thought that this would be all right, because intending purchasers would be able to ascertain the restricted possibilities of the land before they bought it; but clearly the loss would thus only be shifted on to intending vendors.

The Appendices give further explanation of the matter in concise form, and deal with experiments

which are illustrated by plans. The plans are of too small a scale to be of any value, but, magnified, one appeared to consist of fine squares and roadways with truly rural names. Closer inspection showed that they were only dotted lines. But then town-planning is a policy of dotted lines. No doubt the supply will continue to meet the demand, but it is hoped that it may be brought to do so along dotted lines.

There are many people whose frame of mind is more or less expressed by the question, "What is all this one hears about town-planning anyway?" and to them this book will appeal. It is very handy and costs but a shilling. In it they will find a lot of information as to the circumstances which have given rise to what is known as the housing problem; as to the efforts which have been made, and are being made, to deal with it; as to the ideals of simple life, fresh air, sunshine, and elbow-room for all which are held by reformers; and as to the proposed legislation by means of which those reformers hope to make a step towards the realisation of those ideals. But they must not expect to find a solution of the problem. Perhaps when they have read the book they will help to find it.

J. NIXON HORSFIELD [A.].

THE STORY OF A WOODCARVER OF ST. PAUL'S.

[Communicated by WM. J. GRIBBLE [A.].]

The following is a copy of a manuscript preserved in the British Museum. It is a letter written by an ingenious country lad—Phillip Wood, from London—in 1699 to his "sweet mistress, Hannah Haybittle," only daughter of Ralf Haybittle, at Sudbury, Suffolk, describing the means he adopted to procure employment as a carver at the works in St. Paul's Cathedral, then erecting by Sir Christopher Wren, and runs thus:—

No. 9 Ivy Lane, London: Sept. 3rd 1699.

DEAREST HANNAH MY SWEET MISTRESS,—Pray God that this may find my own sweet heart and life well. I hope James Herbert put into your hands one letter which I sent. I gave him the letter myself, and he promised most faithfullie to find occasion to convey it to you. I know, my dear Hannah, you think it both hard and wrong to hide anything from the knowledge of so kind a father as yours. The waggon returns into London on Tuesday, so I went to the yard in Bishops-gate and waited for it to arrive.

At last I heard the bells; and Jim Herbert, as he turned under the gateway, smiled at me pleasantlie and he said, "Wait a bit, young chap, I have somewhat to say to thee." After a while he came to me, and told me how he met you walking on the croft with your maid Susan, and how he contrived to give you my packet unseen of her—to think of such craft under a waggoner's frock!

But no letter from you.

He says that you looked well, and seemed happy to receive my letter, and I am contented. But had you no opportunity to write one line? I know how it is, dear Hannah; you dislike any artifice.

Indeed, it is hardly right for me, who owe so much to your good father, even the ability to write this, as he sent me, a poor Orphan, to the free School, it is hardly right for me to tempt you in this matter.

I can no longer put off telling you the good news: God has, indeed, been good to us. Little did I expect such happiness when I left Sudbury last May; that morning when I looked for the last time from the hill I thought my heart would surely burst, and at one moment I was inclined to turn back; but then came to my mind what kind neighbour Smith should say she heard your Father say about London, so I plucked up courage, and walked very fast over the Tye. Dear Hannah, it is a very sad life to be alone in a great City. At Sudbury, I did contrive to see you, though at a distance, every day, and I could walk in the pleasant fields and think about you, and read Master Shakspeare his plays which you gave me, and which trulie have been laterlie with my Bible my onlie comfort. In the evening I could pass your house to catch a glimpse of your shadowe on your casement, or to hear your spinet sounding; and sometimes I found the neighbours showing the carvings to a farmer or two who had been to market; and it was sweete to my poor vain heart to hear them tell how the rich Merchant Master Haybittle retired from London to his native Town, and bought a House, and employed a poor young man who showed some taste for such matters, to carve upon the wood work, elephants and lions, and other wonderful beasts from the distant lands where he used to send merchandise—then all said the carver must go up to London and become a great man.

Well, I got to London, but no one would employ me, and my little pittance of money got lower and lower; and I used, for want of employment, to go to the Churchyard of S' Paul, and watch the Building, which will certaintie be one of the wonders of the world. Suddenly it struck me one day, they would surely put into such a grand building, carvings such as I have often seen at Melford and the other churches; and I spoke humbly to the foremen, but they repulsed me, saying, "we want no hedge-carpenters here." Nevertheless, I went day after day to look on at a distance; and a week yesterday, as I stood as usual, in great admiration, a gentleman approached, with papers in his hand, and he talked with the work people; and at last his eye fell on me, and he said to the foreman, "What does that young man want? I will not have any person about here unless they have business." And the foreman answered, "Please you, Sir Christopher, he is a country fellow, who continually troubles us to give some of the carving work to do." On this the gentleman who I then knew to be the great Architect, beckoned me to-wards him, and said, "Friend, you want carving work? What have you been used to carve?" Hannah, indeed, you will hardly credit it, but I was so much confused that, forgetting everything but what I earned my bread by whilst I was in the country, I answered, stammeringlie, "Please, your lordship, Sir Christopher, I have been used to carve troughs." "Troughs?" said he; "then carve me, as a specimen of your skill, a sow and pigs; it will be something in your line; and bring it to me this day week. I shall be here." On which

he went away smiling and all the foremen and work people burst into loud laughter.

I do not know how I reached my lodgings, but when I did I threw myself on the bed, and shed bitter tears, and reproached myself for losing such an opportunity of explaining what I had done on your father his house.

In the evening the good Quaker woman whose back-garret I rent, came up stairs, and, entering my room, said, "Friend Phillip, I have not seen thee since morning; I fear thou were ill; see, I have brought thee some broth." But I could not touch it, so she said, "Tell me, I pray thee, thy trouble; it may be I can help thee." So I told her, and she said, "Thou art wrong, for if the man who is building that great Steeple house requires such and such a thing done, why, if thou really hast skill, it will be showed as well in that as in any other matter."

Her words were comforting to me, and I sat up on the bed, and ate the broth, and then I took my last guinea, and I went out and bought a block of pear tree wood, and worked at my task continually; and yesterday morning I dressed myself in my best, and wrapping it in an apron, borrowed from my landlady, I went to the building.

The work people jeered me, and pressed very much that I would show it to them, but on no account would I do so. I waited two or three hours, and then it was rumoured that Sir Christopher Wren was arrived with a party of the quality to whom he was showing the building. At last he and the rest passed where I stood, but when I would have gone forward to speak with him, the foreman and others would have hindered me, saying, "This is not the proper time; you may see that Sir Christopher is otherwise engaged." But necessity made me then bolder, and I said, "He himself appointed me this morning," and I pressed through them. Directly his eye caught me, he beckoned, and I went to-wards him, and I bowed and undid the apron, and presented the carving to him. For a minute he held it in his hand—Oh! dear Hannah! what an anxious minute! and then he said, "I engage you, young man: attend at my office to-morrow forenoon."

Then he walked on with the party, still holding the sow and pigs in his hand, but when he took a little distance, he turned round and said, "Wait until we pass back." So I waited; and when they returned, Sir Christopher came up to me, and said, "Mr. Addison" (I think he said "Addison" or "Addington") "would like to keep your carving, and requests me to give you ten guineas for it." I bowed and then he said, "I fear I did you some injustice, young man; but a great national work is entrusted to my care, and it is my solemn duty to mind that no part of the work falls into inefficient hands." So I bowed and ran home, and my kind landlady was also overjoyed.

This morning I have been at the office, and I am indeed engaged to do carving in this most wonderful building.

I leave at your discretion to acquaint your father of this matter, and if you would write to me only one line, it would increase the happiness of, Dear Hannah, your faithfull servante untill deathe

PHILLIP.

It is added:—

The following notice of Phillip's further career appears in the Report of the Commissioners of Public

Works, respecting the building of St. Paul's Cathedral :

Phillip Haybittle, subpoenaed from Sudbury, Suffolk, deposed that he received certain sums of large amount as per receipts, given during the years 1701-2 3-4 5-6 7 for carved work in the Cathedral Church of St. Paul. On inquiry from their honours the Commissioners respecting the difference betwixt his name and the name on the various receipts, the said Phillip Haybittle deposed that he married Hannah, only daughter of Ralf Haybittle, some time a merchant in Cheapside, and by the terms of the will of his said father in law he was obliged to change his name.

THE ADVANCEMENT OF BRITISH ARCHITECTURE.

10 Lancaster Place, Strand, W.C. : 18 Feb. 1908.

To the Editor JOURNAL R.I.B.A.,—

SIR,—Professor Lethaby, in his recent excellent and interesting Address to Students, remarked that "if all the able and enthusiastic men of this year could get together, they might decide what was to be the course of English architecture during the next twenty or thirty years."

I am pleased to find so high an authority practically agreeing with a suggestion I made some time back in an article published in a daily paper. After remarking that individuality was everything now in English architecture, and that even the individual architects did not often work for long in one style, I said: "If a number of architects banded themselves together for the common good, and agreed to work in one style on the same general lines, leaving scope for individuality in detail, they might in time leaven the whole architectural world and have their style universally adopted."

The First Commissioner of Works is a patron of architects on a very large scale, and might greatly help in the matter if he would give instructions for all his architects to work in agreement. The London Board schools have been generally erected in one style, which has gradually developed and had considerable influence on contemporary architecture. London police stations are a similar instance of a number of buildings designed in unison. The First Commissioner of Works, however, has the erection of much larger and more important buildings and greater opportunities of influencing current taste.

It would generally be agreed, I think, that the selected style should be some form of Renaissance, and a form which has life in it. We do not want mere hushes of eighteenth-century features served cold, without any modern flavouring or anything added to give point or piquancy. We should have good grouping and pleasing proportions worked out with carefully studied detail. Many of the

classic buildings erected of late are sadly lacking in detail. Detail requires careful study. With the amount of work which the First Commissioner's department has in hand, a specialist might be retained to give his sole attention to it—say someone like Mr. Hugh Stannus, who has devoted a lifetime to the study of Renaissance ornamentation and sculpture, and would be able to start where the Renaissance men left off. Such a man could have the supervision of all the sculptors and carvers, and might form a school of ornamentation. We should then have life in the work, and no more repetitions of the same eternal Corinthian capital of the Pantheon at so much a dozen, or hundred, and the same everlasting swags and enrichments all over a façade, but some of the variety of Gothic with the culture of Classic.—I am, &c.

W. J. K. LEVERTON.

THE THEORY OF ARCHITECTURAL REFINEMENTS.

Brooklyn, N.Y. : 31st January 1908.

To the Editor JOURNAL R.I.B.A.,—

SIR,—As bearing on Mr. Prior's letter in your issue of 11th January, it occurs to me to point out that both in my original answer to Mr. Prior (*Architectural Review*, September-October 1906) and in my more recent reply to Mr. Bilson I have abundantly debated the questions which Mr. Prior once more brings up, and which he again raises without considering or mentioning that such answers have been made.

My reply to Mr. Bilson is especially definite regarding buildings published by me which show bends or deflections as regards the question whether they could be explained "by the great stretches of time" which Mr. Prior invokes.

Mr. Prior says: "When the refinements are of inches, in lengths of hundreds of feet, and the consummation of a 'bend' is at an interval of a generation or two after its commencement, the theory of such a scheme requires a special machinery."

I have been careful to point out in the case of the churches which I have published that no such interval is to be presumed.

The cases of curves in plan, as distinct from bends or deflections, which are quoted in the reply to Mr. Bilson are in no case open to the objection which Mr. Prior raises. Should there be any church among those which I have published, concerning which there is any evidence that the entire construction is not homogeneous and contemporaneous, I should be very glad to have such instance mentioned by Mr. Prior. The weakness of Mr. Prior's position is that he does not quote the instances which I have published as open to the objection which he raises.—I am, Sir, very respectfully yours,

WM. H. GOODYEAR.

